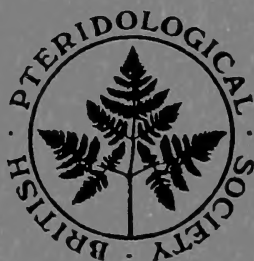


# THE FERN GAZETTE

*Edited by*

*J.M.Camus & J.A.Crabbe*



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## CHECKLIST OF THE PTERIDOPHYTES OF THE MBARACAYÚ FOREST NATURE RESERVE, PARAGUAY

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Key words: checklist, new records, Paraguay pteridophytes, phytogeography.

### ABSTRACT

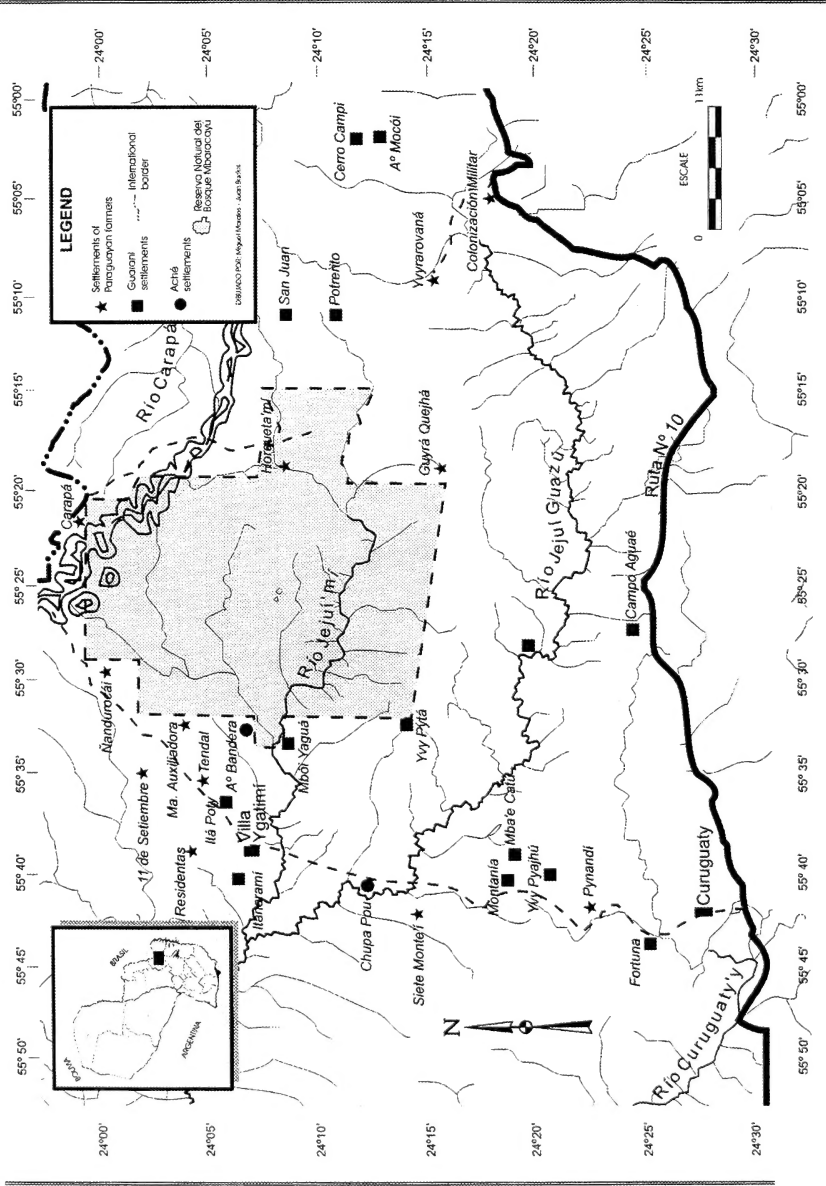
A checklist of the pteridophytes of the Mbaracayú Forest Nature Reserve, eastern Paraguay is presented. This is the first such detailed list for the area and includes 115 taxa in 22 families and 46 genera. Fifteen of these are new published records for Paraguay. Distribution details are provided, and a brief analysis of the phytogeography of the pteridophyte flora is presented. Habitat specialisation in the area is also discussed. Collections for the taxa in the checklist are cited.

### INTRODUCTION

The Mbaracayú Natural Forest Reserve (Reserva Natural del Bosque Mbaracayú) is situated in the north-eastern part of the Oriental region of Paraguay in the department of Canindeyú between 55°20'-55°33'W latitude and 23°59'-24°16'S longitude (Fig. 1). The Reserve covers an area of approximately 600 km<sup>2</sup>, largely covered with Atlantic Forest (*bosque Atlántico Interior*: FMB, 1991; *Selva Paranaense*, Laclau, 1994; *Mata Atlântica*, Davis *et al.*, 1997) and is between 140-150 m above sea level.

In the 1980s the original area of the Reserve (then much smaller than at present) was the property of the World Bank and during its tenure some parts of the forest were selectively logged for tropical hardwoods. In 1991, thanks to the efforts of many individuals and organisations (such as The Nature Conservancy) the area was purchased and passed to the Fundación Mbaracayú for management. At this time the Fundación Moisés Bertoni, a Paraguayan NGO involved in conservation throughout the country, undertook the management and protection of the Reserve. With the help of private donations and the ceding of government controlled lands, the Reserve has grown considerably from its original size. Between 1992 and 1994 approximately 6000 hectares of grassland, the "*campos cerrados*" known as Aguara Ñu, were incorporated into the area of the reserve.

The current area of the Reserve was previously occupied by nomadic hunter-gatherers of the Aché people (Hill & Hurtado, 1996). At the time of contact in the late twentieth century there were four independent populations of Aché. The largest group, the northern Aché, roamed an area of about 18,500 km<sup>2</sup> in North-eastern



Reserva Natural del Bosque de Mbaracayú. Courtesy of Fundación Moisés Bertoni

Paraguay. The northern limit of this group's present territory is in the current Reserve. This northern group numbered about 550 persons before contact (in the 1970s) and inhabited the Río Jejuí drainage, using the natural resources of the then pristine forest. Later, many of the groups mixed and established themselves in association with various missions. The northern Aché people today number about 600 (Hill & Hurtado, 1996). Although all the communities are outside the core protected area of the reserve, the Aché have retained the right to hunt and gather within its limits in their traditional ways.

Other indigenous groups, all members of the Guaraní linguistic family, have more recently migrated to the area and have established communities around the limits of the Reserve. In the area of the *cerrado* the Ava Katuete or Ava Chiripa, who traditionally inhabit the transition zone between *cerrado* and forest, have established communities; near the south-eastern boundary are Mbyá communities; and towards the Río Jejuí Guazú are communities of Pa'i Vavytera (see Fig. 1).

Although all of the communities, Aché and Guaraní, are more or less integrated into Paraguayan society, they all retain much of their traditional knowledge and many of their cultural practices, above all in the uses of the plant life around them. This knowledge needs to be taken into account in planning any study in the region.

With funding from the UK Government's Darwin Initiative for the Survival of Species we have been carrying out an inventory of the plants and selected insect groups in the Mbaracayú Reserve. While preparing a larger checklist of all vascular plants of the Reserve collected during the course of the project, we found an unexpected high diversity of pteridophytes. The checklist we present includes our own collections and those of a past collector in the region, Emile Hassler, a Swiss national who collected in Paraguay between 1885-1913 and in Mbaracayú between 1898-1899. Hassler enumerated 41 species of pteridophytes for the Mbaracayú area.

## STUDY AREA

Approximately 80% of the area of the Mbaracayú Reserve is covered with Atlantic Forest (Fig. 2). This forest is a subtropical semideciduous wet forest (Hueck, 1978; Keel & Herrera-MacBryde, 1997). The extent of the forest cover has been reduced severely in recent times due to deforestation, and now this forest type appears only as fragmented and isolated patches (Bozzano S. & Weik, 1992). These continental forests are similar to those found along the eastern coast of Brazil (see Mori *et al.*, 1983; Mori, 1989), but are distinct in that they harbour several endemic subtropical genera and some tropical and *cerrado* species at the southern edge of their distribution. The affinities of these forests are both with the tropical forests to the north and also with the southern temperate forests, thus making them biogeographically interesting (Keel & Herrera MacBryde, 1997). Atlantic Forest has been designated one of the high priority habitats for conservation on a global scale (Davis *et al.*, 1997) and the Mbaracayú Reserve is the only example of this habitat with effective protection in Paraguay.

The non-forested part of the reserve consists of savannah vegetation made up of *campos cerrados* and other types of grasslands (see Table 1). *Cerrado* vegetation is represented by a wide range of open woodland, open scrub and grassland forms (Eiten, 1972), but is always found on uplands such that the soils are well-drained and do not remain water-logged. In this way it is very different from other grass-dominated vegetation types in South America (Eiten, 1972). *Cerrado* is a climax



Figure 2. Canopy of Atlantic forest, Salto de Karãpa. (Photo S. Knapp).



Figure 3. *Cerrado* vegetation with *Butia paraguayensis* (Barb. Rodr.) L.H. Bailey, Horqueta mi. (Photo S.Knapp).



vegetation type and is not maintained by human interference such as annual burning (Eiten, 1972). Paraguay is the southern limit for *cerrado* vegetation (Dinerstein *et al.*, 1995) which is largely found in Brazil and to a lesser extent in western Bolivia. In Paraguay, *cerrado* vegetation is found mostly in the departments of Amambay, Concepción and Canindeyú. In the Reserve the *cerrado* is a very biodiverse habitat, with grasses, palms and legumes being prominent and an important part of the vegetation (Fig. 3). Wet or semi-flooded grasslands also occur within the limits of the Reserve; here sedges and grasses dominate and the shrubby component of the vegetation is absent.

### LIST OF SPECIES

The following enumeration lists 115 taxa, these belong to 22 families and 46 genera. Many of these records are new published citations for Paraguay, these taxa are indicated with an asterisk in the checklist. We have listed as separate taxa species that we have been unable to identify at present, but that are clearly different from other species in the checklist (e.g. *Thelypteris* sp. #2). For these taxa, only habitat in the Reserve and collections are cited - they are not included in the biogeographical discussion. Names of authors of taxa are abbreviated in accordance with Pichi Sermolli (1996). The taxonomic arrangement follows *Flora Mesoamericana* (Davidse *et al.*, 1995) and within families we use an alphabetical sequence for genera, species and infraspecific taxa. Herbarium acronyms follow Holmgren *et al.*, 1990. In the list we have used the terms for forest types commonly in use in Paraguay (FMB, 1991). A brief description of each forest type and the number of fern species found therein is presented in Table 1.

\* = new records for Paraguay

# = unidentified specimens

### PSILOTACEAE

***Psilotum nudum* (L.) P. Beauv., Prodr. Aethéogam. 106, 112. 1805.**

*Lycopodium nudum* L., Sp. Pl. 1100. 1753; *Psilotum triquetum* Sw., J. Bot. (Schrad.) 1800 (2):109. 1801., nom. superfl. for *Lycopodium nudum* L.; *Psilotum triquetum* var. *gracile* Grev. & Hook., Enum. Fil. in Bot. Misc. 2:362. 1831.

Epiphyte. *Bosque alto*.

Distribution: New and Old World tropics and subtropics.

Material examined: in regione Yerbalium de Mbaracayú, Hassler 5805 (BM); Jejui Mi, sendero principal, B. Jiménez 1254 (PY).

### EQUISETACEAE

***Equisetum giganteum* L., Syst. Nat. ed. 10, 2:1318. 1759.**

*Equisetum schaffneri* Milde, Verh. Zool.-Bot. Ges. Wien 11:345. 1861.

Terrestrial. Flooded grasslands.

Distribution: Mesoamerica, South America to Uruguay and Chile, Antilles.

Material examined: in dumeto ad marginem paludis pr. Igatimi, Hassler 5509 (BM); Valinotti-cue, Jiménez & Marín 1295 (PY, BM, CTES, MO, RP)

**LYCOPODIACEAE**

**Huperzia mandiocana** (Raddi) Trev., Atti Soc. Ital. Sci. Nat. 17:248. 1874.

*Urostachys mandiocanum* (Raddi) Herter, Repert. Spec. Nov. Regni Veg. 19:164. 1923; *Lycopodium mandiocanum* Raddi, Opusc. Sci. 3: 280. 1819.

Epiphyte. *Bosque medio*, on *Sorocea* (Moraceae).

Distribution: Brazil, Paraguay.

Material examined: Carapa, Jiménez & Marín 0192.

**Lycopodiella alopecuroides** (L.) Cranfill, Amer. Fern J. 71:97.1981.

*Lycopodium alopecuroides* L., Sp. Pl. 1102. 1753; *Lycopodium matthewsii* Hook., Icon. Pl. 1: t 26. 1836; *Lepidotis alopecuroides* (L.) Rothm. Repert. Spec. Nov. Regni Veg. 54:66. 1944; *Plananthus alopecuroides* (L.) P. Beauv., Prod. Aethéogam. 111. 1805; *Lycopodiella matthewsii* (Hook.) Holub, Folia Geobot. Phytotax. 18:441. 1983.

Terrestrial. Flooded grasslands.

Distribution: eastern temperate North America, Cuba, throughout continental tropical America.

Material examined: in uliginosis pr. Ipé-hu, Hassler 5264 (BM); Carpa-cue, pastizal sur, 1764 (BM, PY, CTES, RP); Valinotti-cue, Jiménez & Marín 2008 (BM, PY); Valinotti-cue, Peña-Chocarro 336 (BM), Aguara Ñu.

**Lycopodiella caroliniana** (L.) Pic. Serm., var. **meridionalis** (Underw. & F.E. Lloyd) B. Øllg. & P.G. Windisch, Bradea 5:27. 1987.

*Lycopodium meridionale* Underw. & F.E. Lloyd, Bull. Torrey Bot. Club 33:121. 1906; *Pseudolycopodiella meridionalis* (Underw. & F.E. Lloyd) Holub, Folia Geobot. Phytotax. 18:442. 1983.

Terrestrial. Flooded grasslands.

Distribution: widely distributed in tropical America, rare in the Andes.

Material examined: Aguara Ñu, Jiménez 1465 (PY, BM, CTES); Carpa-cue, pastizal Sur, Jiménez 1772 (BM, PY).

**Lycopodiella cernua** (L.) Pic. Serm., Webbia 23:166. 1968.

*Lycopodium cernuum* L., Sp. Pl. 1103. 1753. *Lycopodium cernuum* var. *capillaceum* Spring., Mém. Acad. Roy. Belg. 15 [Mon. Lyc. 1]:80. 1842; *Lycopodium capillaceum* (Spring) Hieron., Bot. Jahrb. Syst. 34:573. 1905.; *Palhinhaea cernua* (L.) Vasc. et Franco, Bol. Soc. Brot. 41:25. 1967.

Terrestrial. Flooded grasslands, river banks.

Distribution: pantropical.

Material examined: in palude pr. flumen Jejui-guazu, Hassler 4677 (BM); in palude pr. Ipé-hu, Sierra de Maracayu, Hassler 5261 (BM); Fazenda Cerro Pora, Marín & Jiménez 314 (PY, BM), Carpa-cue, pastizal sur, Jiménez 1763 (BM, PY, CTES, MO); Lagunita, sendero arroyo Moroti, Jiménez & Marín, 1242 (BM); Valinotti-cue, Jiménez & Marín 1287 (PY, BM, CTES, AA); Valinotti-cue, Peña-Chocarro 337 (BM), Valinotti-cue, Peña-Chocarro 342 (BM).



**SELAGINELLACEAE**

***Selaginella marginata*** (Humb. & Bonpl. ex Willd.) Spring, Flora 21:194. 1838.

*Lycopodium marginatum* Humb. et Bonpl. ex Willd., Sp. Pl. ed. 4, 5:41. 1810; *Selaginella excurrens* Spring in Martius, Fl. Bras. 1(2):128. 1840; *Selaginella marginata* subsp. *distorta* Spring, Flora, Jena 21:196. 1838; *Selaginella marginata* var. *minor* Spring l.c.; *Selaginella distorta* (Spring) Spring, Bull. Acad. r. Belg. 10:229. 1843; *Selaginella distorta* var. *minor* (Spring) Spring, Mém. Acad. r. Sci. Lett. Belg. 24:213; *Selaginella distorta* var. *major* Baker, J. Bot., Lond. 21:335. 1883; *Selaginella chromatophylla* Silveira, Bolm Comm. Geogr. Geol. Minas Geraes 5:124. 1898; *Selaginella urbani* Hieron., in Engl. & Prantl, Nat. Pflanzenfam. 1 (4):709, no. 297. 1901 (1902); *Selaginella moseni* Hieron., in Engl. & Prantl, Nat. Pflanzenfam. 1 (4):709, no. 400. 1901 (1902); *Selaginella burchellii* Hieron., in Engl. & Prantl, Nat. Pflanzenfam. 1 (4):709, no. 403. 1901 (1902).

Terrestrial. Flooded grasslands.

Distribution: Mexico, Venezuela, Bolivia, Brazil, Uruguay, Paraguay and Argentina.

Material examined: Jejuí Mi, pastizal sur, Jiménez & Marín 1261 (BM, PY), Jejuí Mi, pastizal sur, Jiménez & Marín 1278 (BM, PY).

***Selaginella muscosa*** Spring in Martius, Fl. Bras. 1 (2):120. 1840.

*Lycopodium brasiliense* Raddi, Pl. Bras. Nov. Gen.:82. 1825; *Lycopodium crassinervium* Desv., Mém. Soc. Linn. Paris 6:190. 1827; *Lycopodium pallidum* Beyr. ex Gaudich. in Freyc., Voyage Autour Monde, Bot.:285. 1828. Nomen abortivum; *Lycopodium albidulum* var. *majus* Hook. & Grev., Bot. Misc. 2:399. 1831, *Selaginella crassinervia* (Desv.) Spring in Martius, Fl. Bras. 1(2):119. 1840; *Selaginella apus* var. *tetragonostachya* Spring in Martius, Fl. Bras. 1(2):119. 1840; *Selaginella polysperma* Spring, Bull. Acad. R. Belg. 10:138. 1843; *Selaginella beyrichii* A. Braun, Index Sem. Hort. Bot., Berl. Appendix 1857:16. 1857; *Selaginella anocardia* A. Braun, Ann. Sci. Nat. (Bot.) V, 3:290. 1865, non (Desv.) Spring. 1838; *Selaginella deltoides* A. Braun, Ann. Sci. Nat. (Bot.) V, 3:287. 1865; Alston, Reprium Spec. nov. Regni veg. 45:312. 1936; *Selaginella brevipes* Fée, Crypt. Brés.:226. 1869, non A. Braun. 1867; *Selaginella trifurcata* Baker, J. Bot., Lond. 21:98. 1887; Alston, J. Bot., Lond. 72:38. 1934; Knox, Trans. Bot. Soc. Edinb. 35:278. 1950; *Selaginella niederleinii* Hieron., Bot. Jb. 22:418. 1896; *Selaginella feei* Hieron. in Engl. & Prantl, Nat. Pflanzenf. 1 (4):713. 1901; *Selaginella brasiliensis* var. *crassinervia* Hieron. ex Bonap., Notes Ptérid. 2:137. 1915; *Selaginella humilis* sensu Hieron., Hedwigia 58:321. 1917, non Jenman. 1897.

Terrestrial. Flooded grasslands.

Distribution: Tobago, Trinidad and Guyana, west to Colombia and south to northern Brazil; also Argentina, Uruguay and Paraguay.

Material examined: Jejuí Mi, 2 km antes del puesto principal, Jiménez & Marín 1965 (PY, BM).

**MARATTIACEAE**

\* **Danaea nodosa** (L.) Sm., Mem. Acad. Roy. Sci. (Turin) 5:420. 1793.

*Acrostichum nodosum* L., Sp. Pl. 1070. 1753; *Danaea longifolia* Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 5:307. 1811.

Terrestrial. Gallery forest.

Distribution: S. Mexico to Panama, West Indies, Colombia, Venezuela, Surinam, Ecuador, Brazil, Peru, Paraguay.

Material examined: camino Jejui Mi a Lagunita, arroyo Pira-Cajón, *Peña-Chocarro* 359 (BM).

**OSMUNDACEAE**

**Osmunda cinnamomea** L., Sp. Pl. 1066. 1753.

*Osmundastrum cinnamomeum* (L.) C. Presl, Abh. Böhm. Ges. Wiss. 5:326. 1848; *Osmunda imbricata* G. Kunze, Farrnkr. 2:29. 1849; *Osmunda bipinnata* L., Sp. Pl. 1065. 1753.

Terrestrial. Swamps with *Sphagnum*.

Distribution: eastern and central United States and Canada, West Indies, S. Mexico, Mesoamerica, South America to Paraguay and Brazil, South East Asia.

Material examined: Lagunita, sendero arroyo Moroti, *Jiménez & Marín* 1516 (BM, PY); Lagunita, sendero Arroyo Moroti, *Peña-Chocarro* 214 (BM, PY).

**Osmunda regalis** L., Sp. Pl. 1065. 1753.

*Osmunda mexicana* Fée, Mém. Foug. 9:43. 1857; *Osmunda palmeri* A.E. Bobrov, Novesti Sist. Vyssh. Rast. 1968:8. 1968; *Osmunda regalis* L. var. *spectabilis* (Willd.) A. Gray, Manual ed. 2:600. 1856; *Osmunda spectabilis* Willd., Sp. Pl. ed. 4, 5:98. 1810; *Osmunda palustris* Schrad., Gött. Geh. Anz. 866. 1824; *Aphyllocarpa regalis* (L.) Cav., Anal. Cienc. 5:164. 1802.

Terrestrial. Swamps with *Sphagnum*.

Distribution: cosmopolitan.

Material examined: in sylva pr. flumen Tapiraguay, *Hassler* 4150 (BM).

**SCHIZAEACEAE**

**Anemia phyllitidis** (L.) Sw., Syn. Fil. 155. 1806.

*Osmunda phyllitidis* L., Sp. Pl. 1064. 1753; *Anemia haenkei* C. Presl, Reliq. Haenk. 1:74. 1825.

Terrestrial. *Bosque alto*, disturbed *bosque alto*, *bosque medio*, gallery forest.

Distribution: Mexico to Panama, Greater Antilles, Trinidad, Venezuela and Colombia to Argentina and Uruguay.

Material examined: in dumeto pr. flu. Jejui-guazu, *Hassler* 5704 (BM); Jejui Mi, sendero Aguara' i, *Jiménez & Marín* 133 (BM, PY, CTES); La Morena, *Jiménez & Marín* 1348 (PY, BM, CTES, RP); Carapa, *Peña-Chocarro* 227 (BM, PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 232 (BM, PY).

**Anemia phyllitidis** var. **tweediana** (Hook.) Hassl., Trab. Inst. Bot. Farm. Fac. C. Méd. Bs. As. 45:85. 1928.

*Anemia tweediana* Hook., Icon. Pl. t. 906. 1854.

Terrestrial. River banks.

Distribution: E. Paraguay, S. Brazil, Uruguay, N.E. Argentina.

Material examined: Jejui Mi, 1500 m N caseta, *Marín & Jiménez* 192 (BM, PY).

**Anemia tomentosa** (Sav.) Sw. var. **anthriscifolia** (Schrad.) Mickel, Iowa State J. Sci. 36 (4):424. t. 28. 1962.

*Anemia anthriscifolia* Schrad., Gött. Gel. Anz. 1824:625. 1824.

Terrestrial. *Cerrado*, pastures with *Butia* (Arecaceae).

Distribution: Brazil, Bolivia, Paraguay and Argentina.

Material examined: Lagunita, *Marín & Jiménez* 152 (PY); entrada a Aguara Ñu, *Jiménez & Peña-Chocarro* 1240 (BM, PY).

**Anemia tomentosa** (Sav.) Sw. var. **tomentosa** Syn. Fil. 157.1806; Mickel, Iowa State J. Sci. 36 (4):423. t. 27. f. B. 1962.

*Osmunda tomentosa* Savigny in Lam., Encycl. 4:652. 1797.

Terrestrial. *Cerrado*, pastures.

Distribution: S. Brazil, E. Paraguay, Uruguay and Argentina.

Material examined: Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 262 (BM).

**Lygodium volubile** Sw., J. Bot. (Schrad.) 1801 (2):304. 1803.

*Lygodium micans* J. W. Sturm in Mart., Fl. Bras. 1(2):178. 1859.

Terrestrial, scandent on shrubs and low trees. Along streams and river banks, *bosque alto*.

Distribution: S. Mexico to Panama, Trinidad, Greater Antilles, Venezuela to the Guianas, south to Argentina and Brazil.

Material examined: Jejui Mi, Rumbo Norte, *Marín & Jiménez* 150 (PY, BM, CTES); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 255 (BM); Valinotti-cue, *Peña-Chocarro* 287 (BM).

## GLEICHENIACEAE

**Dicranopteris flexuosa** (Schrad.) Underw., Bull. Torrey Bot. Club 34:254. 1907.

*Mertensia flexuosa* Schrad., Gött. Gel. Anz. 863. 1824; *Mertensia rigida* Kuntze, Linnaea 9:16. 1834; *Gleichenia flexuosa* (Schrad.) Mett., Ann. Mus. Bot. Lugduno-Batavum 1:50. 1863; *Gleichenia rigida* (Kuntze) J. Bommer & Christ, Bull. Soc. Roy. Bot. Belgique 35:174. 1896.

Terrestrial. *Cerrado*, river banks in *cerrado* habitat.

Distribution: pantropical.

Material examined: procumbens in argillosis pr. Igatimi, *Hassler* 4864 (BM); Valinotti-cue, *Jiménez & Marín* 1285 (PY, BM, CTES, RP); Aguara Ñu, camino a la

comunidad Tekoha Ryapu, *Jiménez & Marín 2039* (BM, MO, CTES, G); Aguara Ñu, *Marín & Jiménez 247* (PY, BM).

## HYMENOPHYLLACEAE

**Trichomanes cristatum** Kaulf., Enum. Filic. 265. 1824.

*Trichomanes sellowianum* C. Presl, Hymenophyllaceae 15, 37. 1843.

Terrestrial. Swamps with *Sphagnum*.

Distribution: Venezuela and Colombia south to Brazil and Argentina.

Material examined: in sylvis Sierra de Maracayú, *Hassler 5143* (BM); Lagunita, sendero arroyo Moroti, *Jiménez & Marín 1508* (BM, PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 216* (BM, PY).

\* **Trichomanes diaphanum** Humb., Bonpl. & Kunth, Nov. Gen. Sp. 1:25. 1816.

*Trichomanes leptophyllum* Bosch, Ned. Kruidk. Arch.4:363. 1859, non A. Cunn., 1836, *nom illeg.*; *Trichomanes hymenophylloides* Bosch, Ned. Kruidk. Arch. 5:209. 1863, *nom. nov.* for *T. leptophyllum* Bosch and type based on that name; *Vandesboschia diaphana* (Humb., Bonpl. & Kunth) Copel., Philipp. J. Sci. 67:53. 1938; *Vandesboschia hymenophylloides* (Bosch) Copel., Philipp. J. Sci. 67:53. 1938.

Epiphyte. Gallery forest.

Distribution: S. Mexico to Panama, West Indies, Trinidad, Guianas to Colombia, south to Paraguay and Brazil.

Material examined: Jejui Mi, sendero Aguara'i, arroyo Amambay, *Peña-Chocarro 325* (BM); camino Jejui Mi a Lagunita, arroyo Pira-Cajón, *Peña-Chocarro 350* (BM); camino Jejui Mi a Lagunita arroyo Pira-Cajón, *Peña-Chocarro 360* (BM)

**Trichomanes radicans** Sw., J. Bot. (Schrud.) 1800 (2):97. 1802.

*Trichomanes kunzeanum* Hook., Sp. Filic. 1:127. 1884; *Trichomanes brachyblastos* Kuhn, Linnaea 35:388. 1868; *Vandenboschia radicans* (Sw.) Copel., Philipp. J. Sci. 67:54. 1938; *Trichomanes radicans* var. *kunzeanum* (Hook.) Duek & Lellinger, Amer. Fern J. 68:120. 1978; *Crepidomanes radicans* (Sw.) K. Iwats., J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 13 (5):530. 1985.

Hemi-epiphyte. Gallery forest.

Distribution: cosmopolitan.

Material examined: Jejui Mi, *Jiménez & Marín 155* (BM, PY, CTES, RP); Jejui Mi, sendero Aguara' i, arroyo Amambay, *Peña-Chocarro 324* (BM); camino Jejui Mi a Lagunita, arroyo Pira-Cajón, *Peña-Chocarro 358* (BM).

**Trichomanes rigidum** Sw., Prodr. 137. 1788.

*Cephalomanes rigidum* (Sw.) K. Iwats. Acta Phytotax. Geobot. 35 (4-6):177. 1984; *Selenodesmium rigidum* (Sw.) Copel., Philipp. J. Sci. 67:81. 1938; *Trichomanes daucooides* C. Presl, Epim. Bot. 12, t. 7. 1849.

Terrestrial. River banks.

Distribution: S. Mexico to Panama, West Indies, South America to Brazil and Paraguay, Old World tropics.

Material examined: Lagunita, arroyo Moroti, *Marín & Jiménez* 238 (PY, BM); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 270 (BM).

## CYATHEACEAE

**Cyathea atrovirens** (Langsd. & Fisch.) Domin, Pterid. 262. 1929.

*Alsophila atrovirens* (Langsd. & Fisch.) C. Presl, Tent. Pterid. 61. 1836; *Polypodium atrovirens* Langsd. & Fisch., Pl. Voy. Russes Monde (Icon. Filic.) 12, t. 14. 1810; *Trichipteris atrovirens* (Langsd. & Fisch.) R. M. Tryon, Contr. Gray Herb. 200:45. 1970.

Terrestrial. Disturbed *Bosque alto*, *bosque medio* on saturated soil, *bosque bajo* on saturated soils.

Distribution: S. Brazil, Paraguay.

Material examined: in dumetis humidis pr. San Estanislao, *Hassler* 4173 (BM); Jejui Mi, *Jiménez & Marín* 113 (BM, PY, CTES); Jejui Mi, Ycua, *Jiménez & Marín* 123 (PY); Jejui Mi, *Jiménez & Marín* 125 (BM, PY); camino Lagunita-Horqueta-Mi, entre Km 18 y entrada arroyo Morotí, *Marín & Jiménez* 231 (PY, RP); Jejui Mi, sendero Aguara'i, *Marín & Jiménez* 510 (BM, RP); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 220 (BM, PY).

**Alsophila cuspidata** (Kuntze) D.S. Conant, J. Arnold Arbor. 64:371. 1983.

*Nephelea cuspidata* (Kuntze) R. M. Tryon, Contr. Gray Herb. 200:40. 1970; *Cyathea cuspidata* Kuntze, Linnaea 9:101. 1834.

Terrestrial. Gallery forest.

Distribution: Nicaragua to Panama, northern South America to Bolivia and Paraguay.

Material examined: camino Lagunita Horqueta-Mi, arroyo Pira Cajón, *Marín & Jiménez* 217 (PY, BM, CTES, MO); Carapa, sendero Uru'i, *Marín & Jiménez* 332 (PY, BM, CTES, MO, RP).

## PTERIDACEAE

**Adiantopsis chlorophylla** (Sw.) Fée, Mém. Foug. 5:145. 1852.

*Cheilanthes chlorophylla* Sw., Kongl. Vetensk. Acad. Handl. 1817:76. 1817.

Terrestrial. Disturbed and open areas in *bosque alto*, pastures.

Distribution: Mexico, Guatemala, Costa Rica, Colombia south to Argentina and Brazil.

Material examined: camino Jejui Mi a Horqueta-Mi, entre Km 18 y sendero arroyo Morotí, *Marín & Jiménez*, 232 (PY); Jejui Mi, sendero principal Km1-2, *Peña-Chocarro* 205 (BM, PY); Valinotti-cue, *Peña-Chocarro* 285 (BM).

**Adiantopsis radiata** (L.) Fée, Mém. Foug. 5:145. 1852.

*Adiantum radiatum* L., Sp. Pl. 1904. 1753; *Cheilanthes radiata* (L.) J. Sm., J. Bot. (Hook.) 4:159. 1841; *Adiantopsis ternata* Prantl, Gartenfl. 32:101. 1893.

Terrestrial. *Bosque medio*, *bosque medio* on saturated soil.

Distribution: tropical America.

Material examined: Jejui Mi, sendero Aguara-i, *Jiménez & Marín* 128 (PY, BM, CTES); Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez* 303 (BM, PY, CTES); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 261 (BM).

***Adiantum latifolium*** Lam., *Encycl.* 1:43. 1783.

*Adiantum humile* Kunze, *Linnaea* 9:80. 1834; *Adiantum killipii* Maxon & Weath., *Amer. J. Bot.* 19:166. 1932.

Terrestrial. *Bosque alto*, *bosque medio*, *bosque bajo*.

Distribution: Mexico, Mesoamerica, Antilles, Trinidad, Colombia to Venezuela south to Brazil and Paraguay.

Material examined: Jejui Mi, *Jiménez & Marín* 137 (BM, PY, CTES); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 259 (BM); Jejui Mi, sendero Aguara'i, *Peña-Chocarro* 327 (BM).

\* ***Adiantum petiolatum*** Desv., *Ges. Naturf. Freunde Berlin Mag. Neuesten Endeck. Gesammten Naturk.* 5:326. 1881.

*Adiantum kaulfussii* Kunze, *Linnaea* 21:221. 1848; *Adiantum obliquum* Kaulf., *Enum. Filic.* 200. 1824, non Willd.; *Adiantum oblongatum* Schrad., *Gött. Gel. Anz.* 1824:872. 1824.

Terrestrial. River banks.

Distribution: from S. Mexico to Brasil and Paraguay.

Material examined: camino Lagunita a Horqueta-Mi, arroyo Moroti, *Marín & Jiménez* 239 (PY); Lagunita, sendero Arroyo Moroti, *Peña-Chocarro* 231 (BM, PY); Jejui Mi, sendero Jaku-apeti, *Peña-Chocarro* 209 (BM, PY).

***Adiantum pseudo-tinctum*** Hieron., *Engl. Bot. Jahrb.* 22. 394. 1896.

Terrestrial. Open areas in *bosque alto*, degraded *bosque medio*.

Distribution: Brazil, Argentina and Paraguay.

Material examined: Jejui Mi, sendero principal Km 1, *Peña-Chocarro* 200 (BM, PY); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 244 (BM); camino Jejui Mi a Lagunita Km. 4-5, *Peña-Chocarro* 323 (BM).

***Adiantum raddianum*** C. Presl, *Tent. Pterid.* 158. 1836.

*Adiantum cuneatum* Langsd. & Fisch., *Pl. Voy. Russes Monde (Icon. Filic.)* 23, t. 26. 1810; *Adiantum tinctum* Moore, *Gard. Chron.* 1862:932; *Adiantum amabile* Moore, *Gard. Chron.* 1868:1090. 1868, non Liebm. 1849; *Adiantum decorum* Moore, *Gard. Chron.* 1869:582. 1869; *Adiantum moorei* Baker, *Gard. Chron.* 1873:811. 1873, based on *A. amabile* Moore; *Adiantum werckleanum* Christ, *Bull. Herb. Boisser, sér.* 2, 4:1093. 1904.

Terrestrial. *Bosque medio* on saturated soil, gallery forest.



Distribution: S. Mexico, Mesoamerica, Antilles, Trinidad, Colombia, south to Chile and Uruguay.

Material examined: salto Carapa, *Marín & Jiménez 339* (PY); Carapa, camino al salto, *Peña-Chocarro 310* (BM).

***Adiantum serratodentatum*** Humb. et Bonpl. ex Willd., Sp. Pl. ed. 4, 5:445. 1810.

Terrestrial. Bosque medio, pastures, flooded grasslands.

Distribution: tropical America.

Material examined: in sylvia Sierra de Maracayu, *Hassler 5399* (BM); Lagunita, *Jiménez & Marín 48* (BM, PY, CTES); pastizal Sur, Jejui Mi, *Jiménez & Marín 1247* (PY, BM, CTES, MO, RP); entrada a Lagunita, *Peña-Chocarro 213* (BM, PY); Lagunita, *Peña-Chocarro 233* (BM, PY); Valinotti-cue, *Peña-Chocarro 284* (BM); Valinotti-cue, *Peña-Chocarro 338* (BM); río Jejui-Guazu, *Rojas 3621* (BM).

***Adiantum tetraphyllum*** Humb. et Bonpl. ex Willd., Sp. Pl. ed. 4, 5:441. 1810.

Terrestrial. River banks, *bosque medio*, *bosque bajo*.

Distribution: from S. Mexico to Brazil and Paraguay.

Material examined: in sylvia Sierra de Maracayú, *Hassler 5149* (BM); Fazenda Cerro Pora, *Marín & Jiménez 313* (PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 230* (BM, PY); camino Jejui Mi a Lagunita Km 11, *Peña-Chocarro 334* (BM).

***Doryopteris concolor*** (Langsd. & Fisch.) Kuhn., Bot. Öst-Afrika 3(3):19. 1879.

*Pteris concolor* Langsd. & Fisch., Pl. Voy. Russes Monde (Icon. Filic.) 19. 1810; *Cheilanthes concolor* (Langsd. & Fisch.) R.M. Tryon & A. F. Tryon, Rhodora 83:133. 1981.

Terrestrial. *Bosque alto*, disturbed areas in *bosque medio-alto*.

Distribution: tropical America, Asia, Africa, Australia.

Material examined: La Morena, *Jiménez & Marín 1341* (PY, BM, CTES, MO, RP); Carapa, *Peña-Chocarro 226* (BM, PY); Jejui Mi, sendero Jaku-apeti, *Peña-Chocarro 234* (BM, PY).

***Doryopteris lomariacea*** Klotzsch, Linnaea 20:343. 1847.

Terrestrial. Swamps with *Sphagnum*.

Distribution: Guyana, Peru, S. Brazil and Paraguay.

Material examined: in sylvia Sierra de Mbaracayú, *Hassler 5191*(BM); in sylvia pr. fl. Jejui-guazu, *Hassler 5680* (BM); Lagunita, sendero arroyo Moroti, *Jiménez & Marín 1513* (BM, PY, CTES, MO, RP); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 215* (BM, PY).

**Doryopteris nobilis** (Moore) C. Chr., Index Filic. 244. 1905.

*Litobrochia nobilis* Moore, Gard. Chron. Oct. 1862:932. 1862; *Doryopteris raddiana* var. *patula* Fée, Crypt. Vasc. Brésil 1:45. 1869; *Doryopteris patula* (Fée) Fée, Crypt. Vasc. Brésil 2:30. 1872-3.

Terrestrial. *Bosque medio*, gallery forest.

Distribution: Paraguay, Brazil, Argentina.

Material examined: in sylva pr. fl. Tapiraguay, *Hassler 4372* (BM); in sylva Sierra de Maracayu, in sylva pr. fl. Jejui-guazu, *Hassler 5701a* (BM); in sylva pr. fl. Jejui-guazu, *Hassler 5701b* (BM); *Hassler 5388* (BM); Jejui Mi, sendero Jaku-apeti, *Jiménez & Marín 309* (BM, PY); salto de Carapa, *Marín & Jiménez 334* (PY, BM, RP); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 268* (BM); Carapa, camino al salto, *Peña-Chocarro 309* (BM)

**Doryopteris pedata** (L.) Fée var. **multipartita** (Fée) R. M. Tryon, Contr. Gray Herb. Harvard Univ. 143:38, t. 5b. 1942.

*Doryopteris raddiana* var. *multipartita* Fée, Crypt. Vasc. Brésil 1:45. 1869; *Doryopteris multipartita* (Fée) Sehnem, Fl. Ilustr. Catar. I, Pteridác., 176. 1972.

Terrestrial. *Bosque alto*, disturbed *bosque alto*, *bosque medio*, gallery forest.

Distribution: Bolivia, Paraguay, Brazil, Argentina.

Material examined: Jejui Mi, *Jiménez & Marín 142* (BM, PY, CTES); Jejui Mi, sendero Jaku-apeti, *Jiménez & Marín 308* (BM, PY, CTES); Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez 310* (PY); salto de Carapa, *Marín & Jiménez 338* (PY, BM, RP); Jejui Mi, sendero principal, *Marín & Jiménez 460* (PY, BM, CTES); Carapa, *Peña-Chocarro 225* (BM, PY); Jejui Mi, sendero Jaku-apeti, *Peña-Chocarro 235* (BM, PY); Carapa, camino al salto, *Peña-Chocarro 295* (BM).

\* **Pityrogramma calomelanos** (L.) Link var. **austroamericana** (Domin) Farw., Amer. Midl. Naturalist 12:280.1931.

*Pityrogramma austroamericana* Domin, Publ. Fac. Sci. Univ. Charles 88:7. 1928; also in Bull. Misc. Inform. 1929:221; *Pityrogramma calomelanos* var. *aureoflava* auct., non (Hook.) Weath. ex Bailey, Man. Cult. Plants: 64. 1926.

Terrestrial. Open areas, in saturated soils.

Distribution: Mesoamerica, South America to N.E. Argentina, Brazil and Paraguay.

Material examined: Jejui Mi, *Jiménez & Marín 1255* (BM, PY, CTES); Jejui Mi, sendero principal Km1-2, *Peña-Chocarro 203* (BM, PY).

**Pityrogramma calomelanos** (L.) Link, var. **calomelanos** Handbuch 3:20.1883.

*Acrostichum calomelanos* L., Sp. Pl. 1072. 1753; *Acrostichum ebeneum* L., Sp. Pl. 1071.1753; *Gymnogramma calomelanos* var. *denudata* Harr., J. Linn. Soc., Bot. 16:37. 1877; *Pityrogramma ebenea* (L.) Proctor, Brit. Fern Gaz. 9:219.1965.

Terrestrial. Open and disturbed areas, flooded grasslands.

Distribution: Mexico, Mesoamerica, South America to Paraguay and Argentina.

Material examined: in sylva apric apr. Igatimi, *Hassler 4810* (BM); Jejui Mi, *Jiménez & Marín 75* (BM, PY); Valinotti cue, *Jiménez & Marín 1291* (PY, BM, CTES, MO,

RP); ampliación de la Reserva, *Jiménez 1757* (BM, PY, CTES, MO); camino Jejui Mi a Horqueta-Mi, *Marín & Jiménez 233* (PY); Lagunita, *Marín & Jiménez 271* (PY, BM, CTES, MO, GENEVA, RP); Jejui Mi, sendero principal Km1-2, *Peña-Chocarro 202* (BM, PY); Valinotti-cue, *Peña-Chocarro 339* (BM); Valinotti-cue, *Peña-Chocarro 340* (BM); Valinotti-cue, *Peña-Chocarro 344* (BM).

**Pityrogramma trifoliata** (L.) R. Tryon, Contr. Gray Herb. 189:68. 1962.

*Acrostichum trifoliatum* L., Sp. Pl. 1070. 1753; *Trismeria microphylla* Fée, Mém. Foug. 5:165. 1852; *Trismeria trifoliata* (L.) Diels, Nat. Pflanzenfam. 1(4):265. 1899.

Terrestrial. Pastures, open areas.

Distribution: Mexico, Mesoamerica, South America to Chile, N. Argentina and Uruguay.

Material examined: Carapa, camino al salto, *Peña-Chocarro 316* (PY, BM).

\* **Pteris altissima** Poir. in Lam., Encycl. 5:722. 1804.

*Litobrochia kunzeana* (J. Agardh) Fée, Mém. Foug. 5:132. 1850-52; *Pteris elata* J. Agardh, Recens. Spec. Pter. 63. 1839; *Pteris kunzeana* J. Agardh, Recens. Spec. Pter. 62. 1839; *Pteris protea* Liebm., Kongel. Danske Vidensk. Selsk. Skr. Naturvidensk. Afd. 5, 1:228 (seors 76). 1849.

Terrestrial. Gallery forest.

Distribution: from S. Mexico to S. Brazil and Paraguay.

Material examined: Carapa, sendero Uru'i, *Marín & Jiménez 331* (PY, BM, CTES, RP); Carapa, camino al Salto, *Peña-Chocarro 297* (PY, BM, RP).

**Pteris deflexa** Link, Hort. Berol. 2:30. 1833.

*Pteris polita* Link, Hort. Berol. 2:30. 1833.

Terrestrial. *Bosque alto*.

Distribution: tropical South America.

Material examined: Jejui Mi, Rumbo Norte, *Peña-Chocarro 250* (BM); Jejui Mi, sendero principal, Km 4, *Peña-Chocarro 322* (BM).

**Pteris denticulata** Sw., Prodr. 129.1788.

*Pteris brasiliensis* Raddi, Opusc. Sci. 3:293. 1819; *Litobrochia denticulata* (Sw.) C. Presl., Tent. Pterid. 149, t. 5, f. 20. 1836.

Terrestrial. *Bosque alto*, *bosque alto* on saturated soil, *bosque medio*, gallery forest.

Distribution: Paraguay, Brazil and Argentina.

Material examined: Jejui Mi, *Jiménez & Marín 138* (BM, PY); Jejui Mi, *Jiménez & Marín 151* (PY, BM, CTES, RP); La Morena, *Jiménez & Marín 1336* (PY, BM, CTES); Jejui Mi, sendero Aguara'i, *Jiménez 1784* (PY, BM, CTES, MO); Lagunita, sendero arroyo Moroti, *Marín & Jiménez 166* (PY); Jejui Mi, sendero Jaku apeti, *Marín & Jiménez 305* (PY, BM, CTES, MO, G).

**Pteris quadriaurita** Retz., *Observ. Bot.* 6:38. 1791.

*Pteris plumula* Desv., *Mém. Soc. Linn. Paris* 6:297. 1827; *Pteris edentula* Kunze, *Linnaea* 9:75. 1834.

Terrestrial. River banks.

Distribution: tropical America, Old World tropics.

Material examined: camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Peña-Chocarro* 356 (PY, BM, RP).

**Hemionitis tomentosa** (Lam.) Raddi, *Opusc. Sci.* 284. 1819.

*Asplenium tomentosum* Lam., *Encycl.* 2:308. 1786; *Gymnopteris tomentosa* (Lam.) Underw., *Bull. Torrey Bot. Club* 29:627. 1902.

Terrestrial. Gallery forest.

Distribution: Peru to Argentina, Paraguay and Brazil.

Material examined: Carapa, camino al salto, *Peña-Chocarro* 308 (BM); Carapa, el salto, *Peña-Chocarro* 314 (BM).

## VITTARIACEAE

**Vittaria lineata** (L.) Sm., *Mém. Acad. Roy. Sci. (Turin)* 5:421. 1793.

*Pteris lineata* L., *Sp. Pl.* 2:1073. 1753; *Vittaria filiformis* Cav., *Descr. Pl.* 270. 1802.

Epiphyte. *Cerrado*, *bosque bajo* on saturated soil, gallery forest, epiphytic on *Syagrus romanzoffiana* (Arecaceae).

Distribution: tropical America.

Material examined: Jejuí Mi, Rumbo norte, *Jiménez & Marín* 0176 (PY); Aguara Ñu, 1996, *Jiménez & Albert* 1437 (PY, BM); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 269 (BM); Carapa, camino al salto, *Peña-Chocarro* 301 (BM).

## DENNSTAEDTIACEAE

**Dennstaedtia globulifera** (Poir.) Hieron., *Bot. Jahrb. Syst.* 34:455. 1904.

*Polypodium globuliferum* Poir. in Lam., *Encycl.* 5:554. 1804.

Terrestrial. *Bosque alto*, gallery forest.

Distribution: Mexico, Mesoamerica, Venezuela and Colombia, south to Argentina and southern Brazil.

Material examined: in campo pr. fl. Jejuí-guazu, *Hassler* 5702 (BM); Jejuí Mi, *Jiménez & Marín* 129 (BM, PY, CTES); Carapa, camino al salto, *Peña-Chocarro* 298 (BM); Jejuí Mi, camino a Lagunita, Km1, *Peña-Chocarro* 362 (BM).

**Pteridium aquilinum** (L.) Kuhn var. **arachnoideum** (Kaulf.) Brade, *Zeitschrift Deut. Var. Wissen. Kunst, Sao Paulo* 1:56. 1920.

Terrestrial. Clearings in *bosque bajo*.

Distribution: from Mexico to South America.

Material examined: Lagunita, *Marín & Jiménez* 269 (PY).

**Lindsaea guianensis** (Aubl.) Dryand. subsp. **lanceastrum** K.U. Kramer, Acta Bot. Neer. 6:217. 1957.

Terrestrial. *Bosque alto* on saturated soil, *bosque bajo* on saturated soil.

Distribution: C. E. S. Brazil and Paraguay.

Material examined: Jejui Mi, Rumbo Norte, *Jiménez & Marín 172* (BM); Lagunita, sendero arroyo Moroti, *Jiménez & Marín 1514* (BM, PY, CTES, RP); Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez 301* (PY, BM, MO, GENEVA, RP).

**Lindsaea lancea** (L.) Bedd., Suppl. Ferns Brit. Ind. 6. 1876.

*Adiantum lanceum* L., Sp. Pl. ed. 2, 1557. 1763.

Terrestrial. *Bosque alto*, *bosque medio*, *bosque bajo*, on saturated soil.

Distribution: tropical America.

Material examined: in sylva pr. Curuguaty, *Hassler 4614* (BM); in sylva pr. Igatimi, *Hassler 4698* (BM); arroyo Moroti, *Marín & Jiménez 167* (PY); Lagunita, sendero Jaku-apeti, *Peña-Chocarro 210* (BM); sendero Jaku-apeti, *Peña-Chocarro 211* (BM).

**Lindsaea portoricensis** Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Endeck. Gestammten Naturk. 5:326. 1811.

Terrestrial. Swamps with *Sphagnum*.

Distribution: Mexico to Guatemala, Greater Antilles, Guianas to Colombia, south to Bolivia, Brazil and Paraguay.

Material examined: Lagunita, sendero arroyo Moroti, *Peña-Chocarro 218* (BM, PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 228* (BM, PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 229* (BM, PY).

**Lindsaea quadrangularis** Raddi, Opusc. Sci. 3:294. 1819.

Terrestrial. *Bosque medio* on saturated soils.

Distribution: Brazil, Paraguay.

Material examined: Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez 302* (PY, BM, CTES, MO, G, RP).

## THELYPTERIDACEAE

**Macrothelypteris torresiana** (Gaudich.) Ching., Acta Phytotax. Sinica 8:310. 1963. *Polystichum torresianum* Gaudich. in Freyc., Voy. Uranie. 333. 1828; *Aspidium uliginosum* Kunze, Linnaea 20:6. 1847; *Dryopteris uliginosa* (Kunze) C. Chr., Index Filic. suppl. 3:100. 1934; *Thelypteris torresiana* (Gaudich.) Alston, Lilloa 30:111. 1960.

Terrestrial. *Bosque alto*, *bosque medio*, *bosque medio* on saturated soils, river banks, *bosque bajo*.

Distribution: from S.E. United States to S. Brazil, Paraguay and N. Argentina, tropical and subtropical Africa and Asia, Pacific Islands. Adventive in the New World tropics and subtropics.

Material examined: Aguara Ñu, Valinotti-cue, *Jiménez & Marín* 1288 (PY, BM); Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez* 311 (PY, BM, CTES, MO, G,RP); Jejui Mi, sendero Aguara-i, arroyo Amambay, *Marín & Jiménez* 515 (PY); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 258 (BM); camino Jejui Mi a Lagunita, Km 18, arroyo Moroti, *Peña-Chocarro* 289 (BM); Carapa, camino al salto, *Peña-Chocarro* 299 (BM); camino Jejui Mi a Lagunita, Km 5, *Peña-Chocarro* 318 (BM).

\* ***Thelypteris* (Amauropelta) *abbiattii*** Reed, *Phytologia* 17 (4):257. 1968.

*Goniopteris burkartii* C. Chr. ex Abiatti, *Darwiniana* 13 (2-4):556. 1964, non *T. burkartii* Abiatti, 1964.

Terrestrial. Gallery forest on saturated soils, river banks.

Distribution: Argentina, Paraguay.

Material examined: Jejui Mi, sendero Aguara-i, *Jiménez* 1783 (PY, BM, CTES, RP); Jejui Mi, 1500 m N de la caseta, *Marín & Jiménez* 189 (PY, BM, RP); Jejui Mi, sendero Aguara'i, *Peña-Chocarro* 346 (BM).

\* ***Thelypteris* (Goniopteris) *gemmulifera*** (Hieron.) A.R. Sm., *Opera Bot.* 56:30. 1980.

*Dryopteris gemmulifera* Hieron., *Hedwigia* 46:326. 1907; *Goniopteris gemmulifera* (Hieron.) Vareschi, *Fl. Venez.* 1 (1):450. 1969.

Terrestrial. *Bosque alto* in disturbed areas, river banks.

Distribution: Panama, Colombia, Venezuela, Guyana, Ecuador, Paraguay.

Material examined: camino Jejui Mi to Horqueta-Mi, arroyo Moroti, *Marín & Jiménez* 261 (PY, BM); Jejui Mi, sendero Aguara'i, arroyo Amambay, *Marín & Jiménez* 513 (BM, PY); Carapa, camino al salto, *Peña-Chocarro* 291 (BM); Carapa, camino al salto, *Peña-Chocarro* 306 (BM).

***Thelypteris* (Cyclosorus) *hispidula*** (Decne.) C.F. Reed, *Phytologia* 17:283. 1968.

*Aspidium hispidulum* Decne., *Nouv. Ann. Mus. Hist. Nat.* 3:346. 1834; *Nephrodium quadrangulare* Fée, *Mém Foug.* 5:308. 1852; *Dryopteris parasitica* (L.) var. *glanduligera* Rosenst., *Repert. Spec. Nov. Regni Veg.* 7:304. 1909; *Dryopteris quadrangularis* (Fée) Alston, *J. Bot.* 75:253. 1937; *Thelypteris quadrangularis* (Fée) Schelpe, *J. S. African Bot.* 30:196. 1964; *Christella hispidula* (Decne.) Holttum, *Kew Bull.* 31:312. 1976; *Dryopteris limonensis* Christ, *Repert. Spec. Nov. Regni Veg.* 8:18. 1910.

Terrestrial. *Bosque alto*, *bosque medio*, *bosque bajo* on saturated soil, gallery forest.

Distribution: New and Old World tropics and subtropics.

Material examined: Jejui Mi, sendero Aguara-i, arroyo Amambay, *Marín & Jiménez* 517 (PY); Jejui Mi, Km 2 sendero principal, *Peña-Chocarro* 199 (PY, BM); Jejui Mi, rumbo norte, *Peña-Chocarro* 256 (BM, CTES); camino Jejui Mi a Lagunita, Km



7, *Peña-Chocarro* 260 (BM); camino Jejui Mi a Lagunita, Km 4-5, *Peña-Chocarro* 332 (BM); Jejui Mi, sendero Aguara' i, *Peña-Chocarro* 348 (BM, PY, CTES).

\* **Thelypteris** (Steiropteris) **leprieurii** (Hook.) R. M. Tryon, *Rhodora* 69:6. 1967. *Nephrodium leprieurii* Hook., Sp. Filic. 4:106. 1862.

Terrestrial. *Bosque alto*.

Distribution: Mesoamerica, Colombia to Guianas, south to S. Brazil and Paraguay.

Material examined: Carapa, Yku'a, *Jiménez & Marín* 1628 (PY, BM, MO, CTES).

\* **Thelypteris** (Amauropelta) **pachyrhachis** (Mett.) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10:253. 1941.

*Nephrodium crassipes* Sodiro, *Anales Univ. Centr. Ecuador* 9:323. 1893; *Dryopteris pachyrhachis* (Kunze) Kuntze, *Rev. Gen. Pl.* 2:813. 1858; *Aspidium pachyrhachis* Kunze ex Mett., *Farngett.* 4: 83, n. 199. 1858.

Terrestrial. Gallery forest.

Distribution: Costa Rica, Panama, Antilles, Colombia, Venezuela, Ecuador, Peru, Bolivia, S. Brazil and Paraguay.

Material examined: Carapa, sendero Uru'i, *Marín & Jiménez* 349 (PY, BM, CTES), Carapa, camino al salto, *Peña-Chocarro* 296 (BM).

**Thelypteris** (Amauropelta) **rivularioides** (Fée) Abiatti, *Rev. Mus. La Plata*, n.s., Bot. 9:19. 1958.

*Aspidium rivularioides* Fée, *Crypt. Vasc. Brésil* 1:145, t. 50, f. 1. 1869; *Dryopteris rivularioides* (Fée) C. Chr. [apud. Rosenst.], *Hedwigia* 46:125. 1906.

Terrestrial. *Bosque bajo* on saturated soils, pastures on saturated soil.

Distribution: Brazil, Paraguay, Argentina.

Material examined: S Jejui Mi, Puente Carona, *Jiménez & Marín* 277 (PY), Valinotti-cue, *Peña-Chocarro* 335 (PY, MO, CTES, BM).

**Thelypteris** (Goniopteris) **scabra** (C. Presl) Lellinger, *Amer. Fern J.* 74:60. 1984.

*Polypodium scabrum* C. Presl, *Del. Prag.* 1:169. 1822; *Lastrea scabra* (C. Presl) C. Presl, *Epim. Bot.* 41. 1849; *Polypodium tetragonum* var. *incompleta* Lindm., *Ark. F. Bot.* 1:229. 1903, *Dryopteris pseudotetragona* Urban var. *gemmulifera* Hieron. ex Rosenst. forma *major* Rosenst., *Hedwigia* 46:119. 1906/07; *Dryopteris pseudotetragona* Urban var. *foecunda* Rosenst., *Hedwigia* 46:199. 1906/07; *Aspidium caesianum* Christ, *Denkschr. Akad. Wien* 69:114. 1907; *Dryopteris scabra* (C. Presl) C. Chr. var. *incompleta* (Lindm.) C. Chr., *Kongel. Danske Vidensk.-Selsk. Skr. 7 Naturvidensk. Math. Afd. 10* (2):238. 1913; *Dryopteris scabra* (C. Presl) C. Chr. var. *caesarina* (Christ.) C. Chr., *Kongel. Danske Vidensk.-Selsk. Skr. 7 Naturvidensk. Math. Afd. 10* (2):238. 1913.

Terrestrial. Gallery forest.

Distribution: Brazil, Paraguay and Argentina

Material examined: salto Carapa, *Marín & Jiménez* 335 (PY, CTES).

**Thelypteris** (Meniscium) **serrata** (Cav.) Alston, Bull. Misc. Inform. Kew 1932:309. 1932.

*Meniscium serratum* Cav., Descr. Pl. 548. 1802; *Dryopteris serrata* (Cav.) C. Chr., Index Filic. 291. 1905.

Terrestrial. *Bosque bajo* on saturated soil, pastures on saturated soil.

Distribution: from Florida, Antilles and Mexico, to Paraguay, Brazil and N. Argentina.

Material examined: Jejui Mi, Rumbo Norte, *Jiménez & Marín* 177 (BM); Valinotticue, *Peña-Chocarro* 286 (BM).

**Thelypteris sp. #1** (Cyclosurus)

Terrestrial. *Bosque medio*.

Material examined: Jejui Mi, sendero Aguara'i, *Peña-Chocarro* 347 (BM).

**Thelypteris sp. #2** (Amauropelta)

Terrestrial. *Bosque medio* on saturated soil.

Material examined: Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez* 300 (PY, BM, MO).

**TECTARIACEAE**

**Ctenitis eriocaulis** (Fée) Alston, Lilloa 30:112. 1960.

*Aspidium eriocaulon* Fée, Crypt. Vasc. Brésil 1:136, t. 4, p. 1. 1869; *Dryopteris eriocaulis* (Fée) Kuntze, Rev. Gen. Pl. 2:812. 1891.

Terrestrial. *Bosque medio*.

Distribution: Brazil, Paraguay.

Material examined: Jejui Mi, Rumbo norte, *Peña-Chocarro* 243 (BM).

\* **Ctenitis** cf. **falciculata** (Raddi) Ching, Sunyatsenia 5:250. 1940.

*Aspidium falciculatum* Raddi, Opusc. Sci. 3:289. 1819; *Dryopteris falciculata* (Raddi) Kuntze, Rev. Gen. Pl. 3(2):378. 1898; *Aspidium schomburgkii* Klotzsch, Linnaea 20:369. 1847.

Terrestrial. *Bosque alto*.

Distribution: Guyana, Paraguay and Brazil.

Material examined: Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez* 306 (PY, BM, CTES, RP).

**Ctenitis submarginalis** (Langsd. & Fisch.) Ching, Sunyatsenia 5:250. 1940.

*Polypodium submarginale* Langsd. & Fisch., Pl. Voy. Russes Monde 12. 1810; *Aspidium caripense* Mett., Fil. Hort. Bot. Lips. 90, t. 18, f. 9. 1856; *Aspidium karstenii* A. Braun, Index Sem. Hort. Berol. 3. 1857; *Aspidium microcarpon* Fée, Mém. Foug. 8:105. 1857; *Aspidium obtusilobum* Fée, Mém. Foug. 8:105. 1857; *Dryopteris collina* Christ, Bull. Herb. Boissier, sér. 2, 7:922. 1907; *Dryopteris*

*karstenii* (A. Braun) C. Chr., Kongel. Danske Vidensk. Selsk. Skr. Naturvidensk. Afd. 7, 10:98, f. 6. 1913; *Dryopteris submarginalis* (Langsd. & Fisch.) C. Chr., Index Fil. 296. 1905.; *Polypodium caripense* Humb. & Bonpl. ex Willd., Sp. Pl. ed. 4, 5. 1810.

Terrestrial. *Bosque alto*, *bosque medio*, *bosque bajo* on saturated soils.

Distribution: Florida, Hispaniola, S. Mexico to Panama, Venezuela, Colombia, south to Argentina and Uruguay.

Material examined: Jejuí Mi, Rumbo Norte, *Peña-Chocarro* 246 (BM); Jejuí Mi, Rumbo Norte, *Peña-Chocarro* 257 (BM); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 267 (BM); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 282 (BM); Carapa, camino al salto, *Peña-Chocarro* 290 (BM); Carapa, camino al salto, *Peña-Chocarro* 307 (BM); camino Jejuí Mi a Lagunita, Km 5, *Peña-Chocarro* 320 (BM); Jejuí Mi, sendero Aguara'i, *Peña-Chocarro* 349 (BM); Jejuí Mi, sendero Jaku-apeti, *Peña-Chocarro* 361 (BM).

### **Ctenitis sp. #1**

Terrestrial. *Bosque alto*.

Material examined: Jejuí Mi, sendero principal, *Jiménez & Marín* 1587 (PY, BM, CTES).

**Lastreopsis amplissima** (C. Presl) Tindale, Vict. Nat. 73:185. 1957.

*Polystichum amplissimum* C. Presl, Epim. Bot. 58.1851.

Terrestrial. River banks.

Distribution: from Venezuela south to S.E. Brazil and Paraguay.

Material examined: Fazenda Cerro Pora, *Marín & Jiménez* 312 (PY, BM); Lagunita, arroyo Moroti, *Peña-Chocarro* 274 (BM); Lagunita, arroyo Moroti, *Peña-Chocarro* 276 (BM).

**Lastreopsis effusa** (Sw.) Tindale, Vict. Nat. 73:185. 1957.

*Polystichum amplissimum* C. Presl, Epim. Bot. 58. 1851; *Polypodium effusum* Sw., Prodr. 134. 1788.

Terrestrial. *Bosque alto*.

Distribution: from Venezuela to S.E. Brazil and Paraguay.

Material examined: Jejuí Mi, sendero principal Km 1-2, *Peña-Chocarro* 201 (BM, PY); camino Jejuí Mi a Lagunita, Km 5, *Peña-Chocarro* 319 (BM).

**Megalastrum connexum** (Kaulf.) A.R. Sm. & R.C. Moran, Am. Fern. J. 77(4):127. 1987 (Publish. 1988)

*Polypodium connexum* Kaulf., Enum. Filic. 120. 1824; *Ctenitis connexa* (Kaulf.) Copel., Gen. Fil. 124. 1947.

Terrestrial. *Bosque bajo* on saturated soil, *bosque medio*, gallery forest.

Distribution: S. Brazil and Paraguay.

Material examined: Lagunita, arroyo Moroti, *Peña-Chocarro* 221 (BM, PY); Jejui Mi, sendero Aguara-i, *Jiménez & Marín* 123 (BM); Jejui Mi, sendero Aguara-i, arroyo Amambay, *Marín & Jiménez* 516 (PY, BM); Jejui Mi, sendero Aguara-i, *Marín & Jiménez* 511 (PY, BM, CTES).

***Tectaria incisa*** Cav., Descr. Pl. 249. 1802.

*Aspidium macrophyllum* Sw., Syn. Fil. 4:209. 1806; *Aspidium martinicense* Spreng., Anleit. Kenntn. Gew. 3:133. 1804; *Tectaria martinicensis* (Spreng.) Copel., Phil. Journ. Sci. Bot. 2:410. 1907.

Terrestrial. *Bosque alto, bosque bajo*.

Distribution: S. Florida, Mexico, Mesoamerica, S. America to N. Argentina and Paraguay.

Material examined: Jejui Mi, *Jiménez & Peña-Chocarro* 1210 (BM, PY, ); Jejui Mi, 1500m N de la caseta, *Marín & Jiménez* 190 (PY, BM, CTES, MO, RP).

### DRYOPTERIDACEAE

***Cyclodium meniscioides*** (Willd.) C. Presl var. **meniscioides**, Tent. Pterid. 85. 1836. *Aspidium confertum* Kaulf., Enum. Filic. 232. 1824; *Cyclodium confertum* (Kaulf.) C. Presl, Tent. Pterid. 85. 1836; *Dryopteris meniscioides* (Willd.) Kuntze var. *conferta* (Kaulf.) C.V. Morton, Bull. Torrey Bot. Club 66:50. 1939.

Terrestrial. *Bosque bajo* on saturated soil, gallery forest.

Distribution: Venezuela, Trinidad, the Guianas, Brazil, Colombia, Bolivia, N.E. Argentina and Paraguay.

Material examined: in sylv. pr. Igatimi, *Hassler* 4783 (BM); Valinotti-cue, *Jiménez & Marín* 1286 (PY, BM, CTES, RP); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 219 (BM, PY).

***Didymochlaena truncatula*** (Sw.) J. Sm., J. Bot. (Hook.) 4:196. 1841.

*Aspidium truncatulum* Sw., J. Bot. (Schr.) 1800(2):36. 1801; *Adiantum lunulatum* Houtt., Nat. Hist. 14:209. 1783, non Burm.f.

Terrestrial. *Bosque medio*.

Distribution: New and Old World tropics and subtropics.

Material examined: Lagunita, sendero arroyo Morotí, *Peña-Chocarro* 272 (BM).

### WOODSIACEAE

\* ***Diplazium celtidifolium*** Kuntze var. **puberulum** Stolze, Fieldiana, Bot. n.s. 27:84. 1991.

Terrestrial. River banks.

Distribution: Peru, Paraguay.

Material examined: camino Jejui Mi a Horqueta-Mi, arroyo Moroti, *Marín & Jiménez* 257 (PY, BM, RP).

**Diplazium cristatum** (Desr. in Lam.) Alston, J. Bot. 74:173.1936.

*Meniscium cristatum* Desr. in Lam, Encycl. 4:94. 1797.

Terrestrial. *Bosque medio* on saturated soil, *bosque medio*, river banks.

Distribution: Mexico, Mesoamerica, Antilles, Colombia to Venezuela, south to N. Argentina and Paraguay.

Material examined: Jejuí Mi, sendero Aguara'i, *Jiménez & Marín 117* (PY, BM, CTES); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 281* (BM); Carapa, camino al salto, *Peña-Chocarro 300* (BM); Carapa, camino al salto, *Peña-Chocarro 303* (BM); Jejuí Mi, sendero Aguara' i, *Peña-Chocarro 330* (BM).

\* **Diplazium hians** Kunze ex Klotzsch, Linnaea 20:361. 1847.

Terrestrial. *Bosque alto*, on saturated soil.

Distribution: S. Mexico, Mesoamerica, Jamaica, Hispaniola, Colombia, Venezuela south to Brazil and Paraguay.

Material examined: Jejuí Mi, *Jiménez & Marín 115* (BM, PY, CTES).

**Diplazium plantaginifolium** (L.) Urb., Symb. Antill. 4:31. 1903.

*Asplenium plantaginifolium* L., Sys. Nat. ed. 10, 2:1323. 1759; *Asplenium plantagineum* L., Sp. Pl. ed. 2, 1537. 1759; *Diplazium plantagineum* (L.) Sw., J. Bot. (Schr.) 1800 (2): 2. 1801.

Terrestrial. River banks.

Distribution: Mexico to Panama, West Indies, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Paraguay.

Material examined: Jejuí Mi, *Jiménez & Marín 116* (BM, PY, CTES).

\* **Diplazium riedelianum** (Bong. ex Kuhn) Kuhn ex C. Chr., Index Filic. 230. 1905.

*Asplenium riedelianum* Bong. ex Kuhn, Linnaea 36:102. 1869; *Asplenium verapax* Donn.Sm., Bot. Gaz. (Crawfordsville) 13:77, t. 2. 1888; *Diplazium verapax* (Donn.Sm.) Hieron., Hedwigia 59:322. 1917.

Terrestrial. River bank, gallery forest.

Distribution: Mesoamerica, Puerto Rico, Venezuela, Peru, Brazil, Paraguay.

Material examined: camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Marín & Jiménez 226* (PY, BM, CTES); Lagunita, arroyo Moroti, *Peña-Chocarro 279* (BM); camino Jejuí Mi a Lagunita, arroyo Pira-Cajón, *Peña-Chocarro 351* (BM).

\* **Diplazium urticifolium** Christ, Prim. Fl. Costaric. 3:29. 1901.

*Diplazium gemmiferum* Christ, Bull. Herb. Boissier, sér. 2, 7:270. 1907.

Terrestrial. *Bosque alto* on saturated soil, gallery forest.

Distribution: Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Paraguay.

Material examined: Jejuí Mi, *Jiménez & Marín 114* (BM, PY, CTES, RP); camino Jejuí Mi a Lagunita, arroyo Pira-Cajón, *Peña-Chocarro 355* (BM).

**LOMARIOPSIDACEAE**

**Bolbitis serratifolia** (Mert. ex Kaulf.) Schott, Gen. Filic. t. 13. 1835.

*Acrostichum serratifolium* Mert. ex Kaulf., Enum. Filic. 66. 1824; *Bolbitis mexicana* (Christ) C. Chr., Index Filic. suppl. 3:49. 1934; *Leptochilus mexicanus* Christ, Bull. Herb. Boissier, sér. 2, 7:414. 1907.

Terrestrial. Disturbed *bosque alto*.

Distribution: S. Mexico, Mesoamerica, Colombia to Guianas south to Paraguay and N.W. Argentina.

Material examined: camino Lagunita a Horqueta-Mi, sendero arroyo Moroti, *Marín & Jiménez* 227 (PY, BM, CTES); Carapa, sendero Uru'i, *Marín & Jiménez* 330 (PY, BM, CTES); Carapa, camino al salto, *Peña-Chocarro* 304 (BM).

\* **Lomagramma guianensis** (Aubl.) Ching, Amer. Fern. J. 22:17. 1932.

*Polypodium guianense* Aubl., Hist. Pl. Guiane 2:962. 1775; *Leptochilus guianensis* (Aubl.) C. Chr., Bot. Tidsskr. 26:288. 1904; *Bolbitis guianensis* (Aubl.) Vareschi, Flora Venezuela 1:376. 1969.

Terrestrial, scandent on tree trunks. Gallery forest.

Distribution: Greater Antilles, Colombia to the Guianas, south to Brazil, Paraguay and Argentina.

Material examined: camino Jejui Mi a Lagunita, arroyo Pira-Cajón, *Peña-Chocarro* 357 (BM).

**Elaphoglossum balansae** C. Chr., Index Filic. 303. 1905. *nom. nov. pro* *Acrostichum tenerum* Baker.

*Acrostichum tenerum* Baker, J. Bot. 1878:302. 1878; *Elaphoglossum tenerum* (Baker) Christ, Mon. 62. 1899.

Epiphyte.

Distribution: Paraguay.

Material examined: in sylvia pr. Curuguaty, *Hassler* 4612 (BM)

**Elaphoglossum hassleri** Christ, Bull. Herb. Boissier, sér. 2, 7:425. 1907.

Epiphyte (?).

Distribution: Paraguay.

Material examined: in silva prope Igatimi, *Hassler* 5660 (G - n.v., *fide* Christ, 1907).

**Elaphoglossum subcochleare** Christ, Bull. Herb. Boissier, sér. 2, 7:425. 1907.

Epiphyte.

Distribution: Paraguay.

Material examined: in sylvia pr. Igatimi, *Hassler* 5661 (BM, type).



**ASPLENIACEAE**

**Asplenium auriculatum** Sw., Kongl. Vetensk. Acad. Handl. 1817:68. 1817.

*Asplenium salicifolium* L. var. *auriculatum* (Sw.) Proctor in R.A. Howard, Fl. Lesser Antilles 2 (Pteridophyta):321. 1977.

Epiphyte on trunks and tree ferns. *Bosque medio*, gallery forest.

Distribution: S. Mexico, Mesoamerica, Antilles, Colombia, Venezuela, south to Paraguay and Brazil.

Material examined: in sylvia pr. Jejui-guazu, *Hassler* 5697 (BM); Lagunita, sendero arroyo Moroti, *Marín & Jiménez* 163 (PY); Carapa, *Marín & Jiménez* 180 (PY); camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Marín & Jiménez* 221 (PY, BM, MO) Lagunita, sendero arroyo Moroti, Lagunita, *Peña-Chocarro* 278 (BM);

**Asplenium claussenii** Hieron., Hedwigia 60:241. 1919.

Terrestrial or epipetric. *Bosque alto*, gallery forest.

Distribution: northern South America, Greater Antilles and Brazil, Paraguay.

Material examined: camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Marín & Jiménez* 224 (PY, CTES); salto de Carapa, *Marín & Jiménez* 337 (PY, BM, RP), Carapa, *Peña-Chocarro* 224 (BM, PY); Carapa, camino al salto, *Peña-Chocarro* 312 (BM).

**Asplenium cuspidatum** Lam., Encycl. 2:310. 1786.

Terrestrial. *Bosque alto*, *bosque bajo* on saturated soil, *bosque medio*, *bosque medio* dominated by Myrtaceae.

Distribution: S. Mexico, Mesoamerica, Antilles, Colombia, Venezuela, south to Paraguay and Argentina.

Material examined: in sylvia pr. fl. Capibary, *Hassler* 5891 (BM); Jejui Mi, *Jiménez & Marín* 153 (BM, PY, CTES); Jejui Mi, Rumbo Norte, *Jiménez & Peña-Chocarro* 195 (BM); Lagunita, sendero de arroyo Moroti, *Marín & Jiménez* 159 (PY); Carapa, *Peña-Chocarro* 223 (BM, PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 265 (BM); Carapa, camino al salto, *Peña-Chocarro* 315 (BM); Camino Jejui Mi a Lagunita Km 5, *Peña-Chocarro* 321 (BM).

**Asplenium formosum** Willd., Sp. Pl. ed. 4. 5:329. 1810.

Epiphyte. *Bosque alto*.

Distribution: tropical America, Asia, tropical Africa.

Material examined: Jejui Mi, *Jiménez & Peña-Chocarro* 1202 (BM, PY, CTES).

**Asplenium laetum** Sw., Syn. Fil. 79, 271. 1806.

*Asplenium lugubre* Liebm., Kongel. Danske Vidensk. Selsk. Skr. Naturvidensk. Afd. 5, 1:243 (seors 91). 1849; *Asplenium schkuhrianum* C. Presl, Tent. Pterid. 107. 1836; *Asplenium virens* Desv., Mém. Soc. Linn. Paris 6:273. 1827, non C. Presl 1825.

Terrestrial. *Bosque alto* on saturated soil, river banks.

Distribution: tropical America.

Material examined: Jejui Mi, *Jiménez & Marín 150* (BM, PY, CTES); Carapa, camino al salto, *Peña-Chocarro 302* (BM).

**Asplenium mucronatum** C. Presl, Delic. Prag. 1:178. 1822.

Epiphyte. *Bosque medio*, on tree ferns.

Distribution: Brazil, Paraguay.

Material examined: camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Jiménez 1382* (PY, BM, CTES, MO, RP); Carapa, *Marín et al. 179* (PY); Carapa, sendero Uruí, después del Ycuá Sarakí Jhovoy, *Marín & Jiménez* (BM, PY).

**Asplenium serratum** L., Sp. Pl. 1079. 1753.

Epiphyte. *Bosque alto*.

Distribution: S. Florida, Mexico, Mesoamerica, Antilles, Trinidad, Tobago, Colombia, to Guianas, and south to Brazil, Paraguay, Argentina.

Material examined: Jejui Mi, *Jiménez & Marín 134* (BM, PY, CTES).

**Phyllitis balansae** (Bak.) C. Chr., Ind. 492. 1906.

*Scolopendrium balansae* Baker, Icones Pl. 1653. 1886.

Terrestrial. Gallery forest, river banks.

Distribution: Paraguay.

Material examined: Salto de Carapa, *Marín & Jiménez 336* (PY, BM, CTES); salto de Carapa, *Peña-Chocarro 311* (PY, BM).

## BLECHNACEAE

**Blechnum asplenioides** Sw., Kongl. Vetensk. Acad. Handl. 1817: 72, t. 3. 1817.

*Asplenium blechnoides* Sw., Syn. Fil. 76. 1806; *Blechnum unilaterale* Sw., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 4:79. 1810, also Willd. Sp. Pl. ed. 4, 5:407. 1810; *Blechnum polypodioides* Raddi, Opusc. Sci. 3: 294. 1819, non (Sw.) Kuhn. 1868; *Blechnum blechnoides* (Sw.) C. Chr.

Terrestrial. Gallery forest, *bosque alto*.

Distribution: tropical America.

Material examined: arroyo Moroti, *Marín & Jiménez 161* (PY); La Morena, sendero Guazu pyta, *Jiménez & Marín 1334* (BM, PY, CTES, MO).

**Blechnum binervatum** (Poir.) C.V. Morton & Lellinger subsp. **acutum** (Desv.) Tryon & Stolze, Fieldiana, Bot. n.s. 32:64. 1993.

*Lomaria angustifolia* Humb. Bonpl. & Kunth, Nov. Gen. Sp. 1:18. 1816; *Lomaria acuta* Desv., Mém. Soc. Linn. Paris 6:290. 1827; *Lomaria cuspidata* Kunze, Linnaea 9:59. 1834; *Lomaria meridensis* Klotzsch, Linnaea 20:345. 1847; *Lomaria ensiformis* Liebm., Kongel. Danske Vidensk. Selsk. Skr. Naturvidensk. Afd. 5, 1:234. 1849; *Blechnum meridense* (Klotzsch) Mett., Fil. Hort. Bot. Lips. 61. 1856; *Blechnum acutum* (Desv.)

Mett., Ann. Sci. Nat. Bot. Ser.5, 2:225. 1864; *Blechnum angustifolium* (Humb. Bonpl. & Kunth ) Hieron., Bot. Jahrb. Syst. 34:472. 1904, non Willd., 1810; *Blechnum ensiforme* (Liebm.) C. Chr., Index Filic. 153. 1905; *Blechnum kunthianum* C. Chr., Index Filic. 16. 1913, nom. nov. for *Lomaria angustifolia* Humb. Bonpl. & Kunth, non *Blechnum angustifolium* Willd., 1810.

Hemi-epiphyte. Gallery forest.

Distribution: Mesoamerica, Venezuela and Colombia, south to Bolivia and S.E. Brazil.

Material examined: La Morena, sendero Guazu Pyta, *Jiménez & Marín 1337* (PY, BM, CTES, MO, RP); camino Jejui Mi a Horqueta-Mi, arroyo Moroti, *Marín & Jiménez 234* (PY, CTES); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 273* (BM); Carapa, camino al salto, *Peña-Chocarro 305* (BM); camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Peña-Chocarro 354* (BM).

***Blechnum brasiliense*** Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 5:330. 1811.

*Blechnum nigrosquamatum* Gilbert, Bull. Torrey Bot. Club 24:258. 1897; *Blechnum corcovadense* Raddi, Opusc. Sci. 3:294. 1819.

Terrestrial. *Bosque alto*, on saturated soils, *bosque medio* on saturated soil.

Distribution: Guatemala, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Paraguay, Uruguay and Argentina.

Material examined: in sylva pr. Igatimi, *Hassler 4869* (BM); in palude pr. flumen Jejui-guazu, *Hassler 5706* (BM), Jejui Mi, *Jiménez & Marín 126* (BM, PY); Jejui Mi, Rumbo Norte, *Marín & Jiménez 149* (PY, BM, CTES); Jejui Mi, sendero Aguara'i, *Marín & Jiménez 509* (BM, RP); Jejui Mi sendero Jaku-apeti, *Peña-Chocarro 207* (BM, PY) .

***Blechnum fraxineum*** Willd., Sp. Pl. ed. 4, 5:413. 1810.

*Blechnum longifolium* Willd., Sp. Pl. ed 4, 5:413. 1810, non Cav. 1802; *Blechnum gracile* Kaulf., Enum. Filic. 158. 1824.

Terrestrial. River banks.

Distribution: tropical America.

Material examined: Lagunita, arroyo Morotí, *Jiménez & Marín 1198* (PY); Lagunita, arroyo Moroti, *Peña-Chocarro 277* (BM); camino Jejui Mi a Lagunita, arroyo Pira Cajón, *Peña-Chocarro 353* (BM, PY).

***Blechnum lanceola*** Sw., Kongl. Vetensk. Acad. Handl. 1817:71, t. 3, f. 2. 1817.

Terrestrial. River banks.

Distribution: Peru, south to Argentina and east to Brazil.

Material examined: in sylva Sierra de Maracayu, *Hassler 5237* (BM); Lagunita, sendero arroyo Moroti, *Marín & Jiménez 160* (PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 271* (BM); camino Lagunita-Horqueta-Mi, sendero arroyo Pira-Cajón, *Peña-Chocarro 352* (BM, PY).

**Blechnum occidentale** L., Sp. Pl. 1077 [in error as *orientale*]. 1753.

*Blechnum caudatum* Cav., Descr. Pl. 262. 1802; *Blechnum glandulosum* Link., Enum. Hort. Berol. Alt. 2:462. 1822; *Blechnum pectinatum* C. Presl, Reliq. Haenk. 1:51. 1825.

Terrestrial. Gallery forest, river banks.

Distribution: United States, tropical America.

Material examined: in sylvia pr. fl. Capibary, *Hassler 4437*; in sylvia pr. Igatimi, *Hassler 5656* (BM); Jejui Mi, sendero Jaku-apeti, *Peña-Chocarro 208* (BM, PY); Lagunita, sendero arroyo Moroti, *Peña-Chocarro 280* (BM).

\* **Blechnum obtusifolium** (C. Presl) Ettingsh., Denkschr. Kaiserl. Akad. Wiss. Wien 23:59, t. 8, f. 4. 1864.

*Lomaria obtusifolia* C. Presl, Tent. Pterid. 143. 1836.

Terrestrial. Swamps with *Sphagnum*.

Distribution: Peru and N.W. Argentina, S.E. Brazil and Paraguay.

Material examined: Lagunita, sendero arroyo Moroti, *Peña-Chocarro 217* (BM, PY).

## POLYPODIACEAE

**Campyloneurum leuconeurum** Fée, Crypt. Vasc. Brésil 1. 103, t. 35, f. 1. 1869.

Epiphyte or terrestrial. Gallery forest, *bosque medio*, disturbed *bosque alto*.

Distribution: S. Brazil, Uruguay, Paraguay.

Material examined: Carapa, sendero Uru'i, *Marín & Jiménez 326* (PY, BM, CTES); Carapa, camino al salto, *Peña-Chocarro 293* (BM); Carapa, camino al salto, *Peña-Chocarro 313* (BM).

**Campyloneurum nitidum** C. Presl, Tent. Pterid. 190. 1836.

Epiphyte. Gallery forest, on tree-ferns.

Distribution: S. Brazil, Uruguay, Paraguay.

Material examined: Camino Lagunita a Horqueta-Mi, arroyo Pira Cajón, *Jiménez 1381* (PY, BM, CTES, MO, RP).

**Campyloneurum phyllitidis** (L.) C. Presl, Tent. Pterid. 190. 1836.

*Polypodium phyllitidis* L., Sp. Pl. 1083. 1753; *Cyrtophlebium phyllitidis* (L.) J.G. Sm., J. Bot. (Hook.) 4: 58. 1841.

Terrestrial. *Bosque medio*.

Distribution: southern United States, Mesoamerica, West Indies, Colombia and Venezuela to Bolivia and C. Brazil.

Material examined: Jejui Mi, sendero Aguara'i, *Peña-Chocarro 331* (BM).

**Marginaria hirsutissima** (Raddi) Pic. Serm., Webbia 31(1):248. 1977.

*Polypodium hirsutissimum* Raddi, Opusc. Sci. 3:286. 1819; *Polypodium rufulum* C. Presl, Delic. Prag. 1:164. 1822; *Polypodium vexillare* Chr., Bull. Herb. Boissier, sér. 2, 2:373. 1902.

Epiphyte. *Cerrado* on *Butia* (Arecaceae), *bosque bajo*, *bosque bajo* on saturated soils.

Distribution: Brazil, Paraguay, Uruguay, Argentina.

Material examined: Lagunita, sendero arroyo Moroti, *Marín & Jiménez 156* (PY); Aguara Ñu, *Jiménez & Marín 1318* (PY, BM, CTES); Jejui Mi, *Jiménez & Marín 193* (BM, PY, CTES); Valinotti-cue, *Peña-Chocarro 288* (BM).

**Microgramma lindbergii** (Mett.) de la Sota, Opera Lilloana 5:56, f. 2, 5. 1961.

*Polypodium lindbergii* Mett., Linnaea 36: 136. 1869.

Epiphyte. *Bosque alto*, *bosque medio*, *bosque medio* on saturated soil.

Distribution: Brazil and Paraguay.

Material examined: in sylvia Igatimi, *Hassler 4892* (BM); Jejui Mi, *Jiménez & Marín 130* (BM, PY, CTES); Jejui Mi, *Jiménez & Marín 147* (BM, PY, CTES); Jejui Mi, sendero Jaku-apeti, *Marín & Jiménez 304* (PY, BM, CTES, G, RP); Jejui Mi, sendero principal Km1-2, *Peña-Chocarro 204* (BM, PY); Jejui Mi, sendero Jaku-apeti, *Peña-Chocarro 206* (BM, PY); Jejui Mi, sendero Aguara'i, *Peña-Chocarro 329* (BM).

**Microgramma persicariifolia** (Schrad.) C. Presl, Tent. Pterid. 214. 1846.

*Polypodium persicariifolium* Schrad., Gött. Gel. Anz. 1824:867. 1824.

Epiphyte. Disturbed *bosque alto*, *bosque bajo* on saturated soil.

Distribution: Central America, Antilles, Colombia to Guyana south to C. Brazil and Paraguay.

Material examined: in sylvia pr. San Estanislao, *Hassler 4145* (BM); Jejui Mi, Rumbo Norte, *Peña-Chocarro 253* (BM); Jejui Mi, Rumbo Sur, *Jiménez & Marín 1283* (PY).

**Microgramma squamulosa** (Kaulf.) de la Sota, Opera Lilloana 5:59. 1961.

*Polypodium squamulosum* Kaulf., Enum. Filic. 89. 1824.

Epiphyte. *Bosque alto*, *bosque medio*, *bosque bajo* on saturated soils, gallery forest.

Distribution: Peru, Bolivia, S.E. Brazil, Argentina, Paraguay and Uruguay.

Material examined: in sylvia pr. Sierra de Maracayu, *Hassler 4887* (BM); in sylvia pr. Sierra de Maracayu, *Hassler 5372* (BM); Jejui Mi, rumbo Norte, *Jiménez & Marín 1267* (PY); Arroyo Guyra-Keha, *Marín & Jiménez 254* (PY, BM); camino Jejui Mi-Lagunita, Km 2, *Marín 500* (PY, BM, CTES); Jejui Mi, sendero Jaku-apeti, *Peña-Chocarro 236* (BM, PY); Jejui Mi, Rumbo Norte, *Peña-Chocarro 251* (BM); Jejui Mi, sendero Aguara'i, *Peña-Chocarro 328* (BM).

**Microgramma vacciniifolia** (Langsd. & Fisch.) Copel., Gen. Fil. 185. 1947.

*Polypodium vacciniifolium* Langsd. & Fisch., Pl. Voy. Russes Monde (Icon. Filic.) 8. 1810.

Epiphyte. *Bosque alto*, *bosque medio*.

Distribution: West Indies, Venezuela and Colombia, south to Paraguay and Argentina.

Material examined: Jejui Mi, sendero principal, *Jiménez 1741* (BM, PY, CTES, MO, RP); Jejui Mi, sendero Aguara'i, *Jiménez & Marín 0136* (PY); Jejui Mi, sendero

Aguara'i, *Peña-Chocarro* 326 (BM); Jejui Mi, sendero principal Km 1, *Peña-Chocarro* 343 (BM).

\* ***Pecluma camptophyllaria*** (Fée) M.G. Price var. ***lachnifera*** (Hieron.) Lellinger, Amer. Fern J. 74:59. 1984.

*Polypodium camptophyllum* Fée var. *lachniferum* (Hieron.) Evans, Ann. Missouri Bot. Gard. 55: 254. 1969; *Polypodium lachniferum* Hieron., Bot. Jahrb. Syst. 34: 515. 1904.

Epiphyte. *Bosque alto*.

Distribution: Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil and Paraguay.

Material examined: Carapa, *Peña-Chocarro* 222 (BM, PY).

***Pecluma filicula*** (Kaulf.) M.G. Price, Amer. Fern. J. 73:114. 1983.

*Polypodium filiculum* Kaulf., Enum. Filic. 275. 1824.

Epiphyte. *Bosque alto*, *bosque medio*, *bosque bajo* on saturated soil.

Distribution: Colombia to Argentina and S. Brazil.

Material examined: Jejui Mi, camino principal Km 8, *Jiménez & Marín* 168 (BM); Lagunita, sendero arroyo Morotí, *Peña-Chocarro* 266 (BM).

***Pecluma ptilodon*** (Kunze) M. G. Price var. ***robusta*** (Fée) Lell., Am. Fern. J. 74:60. 1984.

*Polypodium ptilodon* Kunze, Linnaea 9:42. 1834. *Polypodium robustum* Fée, Crypt. Vasc. Brésil 1:92, t. 28, f. 1. 1869.

Terrestrial. *Bosque alto*, gallery forest, *bosque bajo* on saturated soils.

Distribution: Bolivia and E. Brazil to N. Argentina.

Material examined: Sierra de Maracayú, Iगतimi, *Hassler* 5511 (GH, BM); sendero Aguara'i, *Jiménez & Marín* 0152 (PY); Jejui Mi, Rumbo norte, *Jiménez & Marín* 0174 (PY, BM, CTES, MO); Carapa, *Marín & Jiménez* 174 (PY); Jejui Mi, sendero Jakupeti, *Marín & Jiménez* 299 (PY, BM, CTES, MO, RP); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 248 (PY, BM); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 254 (BM); Jejui Mi, sendero Aguara'i, arroyo Amambay, *Peña-Chocarro* 345 (BM).

***Pecluma sicca*** (Lindm.) M. G. Price, Am. Fern J. 73. 1983.

*Polypodium siccum* Lindm., Ark. Bot. 1:234, t. 11, f. 4. 1903.

Epiphyte. *Bosque medio*, gallery forest.

Distribution: S.E. Brazil, Paraguay and N. Argentina.

Material examined: Rumbo Norte, *Peña-Chocarro* 245 (BM), Carapa, camino al salto, *Peña-Chocarro* 294 (BM).

***Phlebodium decumanum*** (Willd.) J. Sm., J. Bot. (Hooker) 4:59. 1841.

*Polypodium decumanum* Willd., Sp. Pl. ed. 4, 5:170. 1810.

Epiphyte. *Cerrado* on *Butia* (Arecaceae).



Distribution: tropical America.

Material examined: Aguara Ñu, camino a la comunidad Tekoha ryapu, *Esquivel* 24 (BM).

**Pleopeltis pleopeltifolia** (Raddi) Alston, Bol. Soc. Brot. ser. 2 30:21. 1956.

*Polypodium pleopeltifolium* Raddi, Opusc. Sci. 3:286. 1819.

Epiphyte. *Bosque alto*, *bosque medio*, *bosque bajo* on saturated soils.

Distribution: Brazil, Paraguay.

Material examined: Jejui Mi, sendero Aguara'i, *Jiménez & Marín* 0119 (PY); Jejui Mi, sendero Aguara'i, *Jiménez & Marín* 0134 (PY); Jejui Mi, sendero Aguara'i, *Jiménez & Marín* 0148 (PY); Jejui Mi, Rumbo Norte, *Jiménez & Marín* 1181 (PY); Carapa (Yku'a), *Jiménez & Marín* 1624 (BM, PY, CTES, MO); Carapa, *Marín & Jiménez* 181 (PY); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 252 (BM); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 263 (BM); Lagunita, sendero arroyo Moroti, *Peña-Chocarro* 264 (BM).

**Polypodium latipes** Langsd. & Fisch., Pl. Voy. Russes Monde (Icones Filic.): 10 t. 10. 1810.

*Polypodium loriceum* sensu Humb. Bonpl. & Kunth, non L.; *Polypodium harpeodes* Link, Hort. Berol. 2:97. 1833; *Polypodium vacillans* Link, Hort. Berol. 2:97. 1833; *Goniophlebium pectinans* Fée, Crypt. Vasc. Brésil 1:109, t. 39, f. 1. 1869.

Epiphyte or terrestrial. *Bosque bajo*, pastures in *cerrado*, *cerrado* (on *Butia paraguayensis* - Arecaceae), pastures.

Distribution: Guyana, Brazil and Paraguay.

Material examined: Jejui Mi, *Jiménez & Marín* 73 (BM, PY, CTES); camino a Aguara Ñu, *Jiménez & Marín* 1301 (PY, BM); Aguara Ñu, *Jiménez & Marín* 1308 (PY, BM, CTES, MO, RP); Lagunita, *Marín & Jiménez* 268 (PY, BM, CTES, RP); entrada a Lagunita, *Peña-Chocarro* 212 (BM, PY); camino Jejui Mi a Lagunita, Km 11, *Peña-Chocarro* 333 (BM).

**Polypodium polypodioides** (L.) Watt, Canad. Naturalist & Quart. J. Sci. ser. 2, 3:158. 1867.

*Acrostichum polypodioides* L., Sp. Pl. 1068. 1753.

Epiphyte. *Bosque alto*, gallery forest, *bosque bajo* on saturated soils.

Distribution: S.E. United States, Mesoamerica, Antilles and South America.

Material examined: arroyo Moroti, *Marín & Jiménez* 169 (PY); Jejui Mi, sendero Jaku apeti, *Marín & Jiménez* 295 (PY, BM); Jejui Mi, Rumbo Norte, *Peña-Chocarro* 249 (BM); camino Jejui Mi to Lagunita, sendero principal, Km 22, *Peña-Chocarro* 283 (BM); Carapa, camino al salto, *Peña-Chocarro* 292 (BM).

**Polypodium triseriale** Sw., J. Bot. (Schrad.) 1800 (2):126. 1801.

*Polypodium longifolium* Presl, Delic. Prag. 1:167. 1822; *Polypodium preslianum* Spreng., Syst. Veg. ed. 16, 5:556 (index). 1828; *Gonophlebium triseriale* (Sw.) Lawalrée, Bull. Jard. Bot. Belg. 50(3-4):516. 1980.

Terrestrial. *Bosque alto*, disturbed *bosque alto*, periodically flooded *bosque medio*.

Distribution: Mesoamerica, Antilles, Trinidad, Colombia, Venezuela, Guyana, south to Brazil and Paraguay.

Material examined: Jejui Mi, sendero principal, *Jiménez & Marín 1481a* (BM); Jejui Mi, Rumbo Norte, *Marín & Jiménez 148* (PY, BM); Jejui Mi, puente Carona, *Marín & Jiménez 283* (PY, BM).

## SALVINIACEAE

*Salvinia minima* Baker, J. Bot. 24:98. 1886.

*Salvinia rotundifolia* auct., non Willd.

Aquatic. Rivers, ponds.

Distribution: S.E. United States, Mesoamerica, Antilles, Bermudas, Colombia Venezuela, south to Uruguay, Paraguay and N. Argentina.

Material examined: Jejui Mi, 1500 m N de la caseta, *Marín & Jiménez 194* (PY, BM); Jejui Mi, Puente Carona, *Marín & Jiménez 294* (PY).

## DISCUSSION

The diversity in the Mbaracayú region has, at least in part, been attributed to its position on a phytogeographic ecotone and to the mixing of tropical and temperate elements in the flowering plant flora (Keel & Herrera-MacBryde, 1997). These ideas are based largely on angiosperm taxa and the degree to which pteridophyte distribution and diversity patterns mirror those of angiosperms has only rarely been discussed (Smith, 1972; Kramer, 1993). In the Neotropics four principal regions of pteridophyte species diversity have been identified: Greater Antilles, southern Mexico and Central America, the Andes, and southeastern Brazil (Tryon, 1972; Tryon & Tryon, 1982). If the diversity of pteridophytes in Mbaracayú is due to the mixing of floristic regions, we expect to see evidence of this in the taxa encountered in the region. However, edaphic specialization may also contribute to the high pteridophyte diversity seen in the Neotropics in general (Poulsen & Tuomisto, 1995; Tuomisto & Poulsen, 1996), and this may also be contributing to diversity in Mbaracayú.

The majority of pteridophyte species present in Mbaracayú are widely distributed, ranging from Mexico throughout tropical America to Paraguay, Brazil and northern Argentina (62 species). One species is introduced from the Old World tropics, six are pantropical, four widespread in the New and Old World Tropics and subtropics and the remaining thirty six have a more restricted distribution. Of these last thirty six, six belong to genera which are most diverse in southeastern Brazil (*Doryopteris* and *Anemia*) and four (*Phyllitis balansae* (Bak.) C. Chr. and probably all three species of *Elaphoglossum*) are endemic to Paraguay. In general, therefore, there is a mixing of species from different areas of pteridophyte diversity, but the majority of species are of relatively wide distribution. Those taxa with more restricted distributions are generally from the southeastern Brazilian area (sensu Tryon & Tryon, 1982), and are found in Brazil, Paraguay, Uruguay and Argentina. Some of these also reach Peru and Bolivia, but not the majority.

**Table 1. Habitat types in the Mbaracayú Forest Nature Reserve. Totals do not equal the number of pteridophyte taxa in the checklist as species often occur in more than one habitat, see text for details.**

Terms used in the checklist	Description of habitat	Number of species
<i>Bosque alto</i>	This forest type covers 17.000ha (30% of the total covered area in the Reserve) and the canopy reaches 30 m in height. Soils are deep, with abundant organic matter. The forest shows three distinct strata: the canopy is composed of various genera, including <i>Aspidosperma</i> , <i>Tabebuia</i> , <i>Astronium</i> , <i>Peltophorum</i> ; the middle layer is formed of species that reach c. 20 m in height and among the genera common in this layer are <i>Guarea</i> , <i>Eugenia</i> , <i>Ocotea</i> , <i>Nectandra</i> , <i>Campomanesia</i> , <i>Chrysophyllum</i> , etc.; in the lower stratum <i>Sorocea bonplandii</i> (Baill.) W.G. Burger, Lanjouw & Wess. Boer is dominant, other common species are <i>Hennecartia</i> , <i>Sebastiania brasiliensis</i> Spreng., <i>Clavija nutans</i> (Vell.) Stahl, <i>Trichilia</i> , etc. Epiphytes occur and lianas are extremely important.	43
<i>Bosque medio</i>	This forest type covers 30% of the total forested area of the reserve and reaches c. 20 m in height. Soils are sandy and well-drained. Several types of bosque medio can be distinguished, some dominated by <i>Myrcianthes pungens</i> O. Berg., with <i>Ocotea</i> , <i>Myrciaria rivularis</i> (Cambess.) O. Berg., <i>Myrciaria cuspidata</i> O. Berg., etc., while another distinct type is dominated by <i>Copaifera langsdorfii</i> Desf., with <i>Tabebuia</i> , <i>Guarea</i> , <i>Eugenia</i> , etc.	37

Gallery forest	In this category we include forest types of medium to low canopy height on sandy soils, which are on slopes ending in water courses or along streams and are thus subject to periodic inundation. Some of the important canopy species in these forests are: <i>Copaifera langsdorfii</i> Desf., <i>Luehea divaricata</i> Mart., <i>Inga uruguensis</i> Hook. & Arn., <i>Nectandra megapotamica</i> (Spreng.) Mez., etc. <i>Bambusa guadua</i> Bonpl. can be important on the banks of the rivers, forming dense and often nearly pure stands. In the middle strata are found <i>Sebastiania</i> sp., <i>Myrciaria rivularis</i> (Cambess.) O. Berg., <i>Esenbeckia grandiflora</i> Mart., <i>Trichilia pallida</i> Sw., etc. Piperaceae, Rubiaceae and Melastomataceae are abundant in the understory.	33
<i>Bosque bajo</i>	Includes those forests where the canopy is up to 10 m in height, and usually occurs on poor soils and depressions that are saturated, and either permanently or periodically inundated. In the reserve, bosque bajo covers 16.000 ha and is the third most common habitat type. The dominant family in these forests is Myrtaceae.	24
<i>Sphagnum</i> swamps	This subcommunity occurs within bosque bajo on super saturated soils. Trees are scarce and usually stunted. Common families are: Myrtaceae, Myrsinaceae, Aquifoliaceae and Styracaceae.	6
<i>Cerrado</i>	Grassland on well-drained, sandy soils. Generally occurring on uplands, and comprises a wide variety of mixed grass and shrub communities. Some common families are Annonaceae, Erythroxylaceae, Arecaceae (genera <i>Butia</i> and <i>Syagrus</i> ).	7
Flooded grasslands	Grassland communities on slopes which terminate in water courses. These pastures act as water sinks, and are on alluvial soils that are poor in organic material, phosphorus, potassium and calcium. Dominant families are Poaceae and Cyperaceae. The genera <i>Paspalum</i> and <i>Setaria</i> are among the most species-rich.	8
River bank	Open habitat along river courses, usually with high light intensity.	20
Pastures	This community occupies a total of 1415 ha in the Reserve (including flooded grasslands). Soils are poor and badly drained. Pastures are dominated by graminoids, such as <i>Andropogon</i> , <i>Axonopus</i> , <i>Loudetia</i> . Common angiosperm families (in addition to Poaceae) are Asteraceae, Turneraceae, Sterculiaceae and Fabaceae.	8

Field observations indicate that pteridophyte species are clearly associated with particular habitats in the Mbaracayú reserve, and that soil diversity may have a large impact on the resulting floristic diversity in these forests, as has been shown in the Peruvian Amazon (see Young & León, 1989; Poulsen & Tuomisto, 1996; Tuomisto & Poulsen, 1996). Numbers of pteridophyte taxa found in each of our habitat divisions are shown in Table 1 (habitats follow FMB, 1991). Associations of pteridophyte species with habitat in Mbaracayú are shown in Table 2, where taxa found specifically in a single habitat are listed. Taxa found in more than one habitat are not included in Table 2. Our data are similar to those of Tuomisto & Poulsen (1996), with species of *Pteris*, *Bolbitis*, *Diplazium*, *Alsophila*, *Tectaria*, *Danaea* and *Didymochlaena* occurring on rich soils and species of *Lindsaea* occurring on poor soils. In Mbaracayú the rich soils along river banks harbour many fern species; light levels here are also high.

It is clear that at least some mixing of species from different centres of pteridophyte diversity is occurring in Mbaracayú. However, due to generally wider distributions of pteridophyte taxa than their angiosperm counterparts (Smith, 1972), it is more difficult to assess whether or not this mixing accounts for the high diversity we have observed, or if edaphic and other habitat factors are more important. It is likely that both have contributed to the rich pteridophyte flora we document here.

**Table 2. Habitat associations of Mbaracayú pteridophytes based on field observations. See text.**

Habitat	Pteridophyte taxa
<i>Sphagnum</i> swamps	<i>Osmunda cinnamomea</i> L. <i>Trichomanes cristatum</i> Kaulf. <i>Doryopteris lomariacea</i> Klotzsch <i>Lindsaea portoricensis</i> Desv. <i>Blechnum obtusifolium</i> (C. Presl) Ettingsh.
Cerrado	<i>Anemia tomentosa</i> var. <i>anthrisifolia</i> (Schrad.) Mickel <i>Anemia tomentosa</i> (Sav.) Sw. var. <i>tomentosa</i> <i>Dicranopteris flexuosa</i> (Schrad.) Underw.
Flooded grasslands	<i>Equisetum giganteum</i> L. <i>Lycopodiella alopecuroides</i> (L.) Cranfill <i>Lycopodiella caroliniana</i> var. <i>meridionalis</i> (Underw. & F.E. Lloyd) B. Øllg.  <i>Lycopodiella cernua</i> (L.) Pic. Serm. <i>Selaginella marginata</i> (Humb. & Bonpl. ex Willd.) Spring. <i>Selaginella muscosa</i> Spring
Disturbed areas	<i>Pityrogramma calomelanos</i> var. <i>austroamericana</i> (Domin) Farw. <i>Pityrogramma trifoliata</i> (L.) R. Tryon
Saturated soils in forest	<i>Lindsaea guianensis</i> var. <i>lanceastrum</i> K.U. Kramer <i>Lindsaea lancea</i> (L.) Bedd. <i>Lindsaea quadrangularis</i> Raddi <i>Diplazium hians</i> Kuntze <i>Blechnum brasiliense</i> Desv.

Table 2 continued

In forests (Bosque alto or alto/medio)	<i>Huperzia mandiocana</i> (Raddi) Trevis. <i>Anemia phyllitidis</i> (L.) Sw. <i>Adiantopsis radiata</i> (L.) Fée <i>Adiantum latifolium</i> Lam. <i>Doryopteris concolor</i> (Langsd. & Fisch.) Kuhn. <i>Pteris deflexa</i> Link <i>Thelypteris leprieurii</i> (Hook.) R.M. Tryon <i>Ctenitis euriocaulis</i> (Fée) Alston <i>Ctenitis falciculata</i> (Raddi) Ching <i>Ctenitis submarginalis</i> (Langsd. & Fisch.) Ching <i>Lastreopsis effusa</i> (Sw.) Tindale <i>Tectaria incisa</i> Cav. <i>Didymochlaena truncatula</i> (Sw.) J. Sm. <i>Bolbitis serratifolia</i> (Mert. Ex Kaulf.) Schott <i>Asplenium formosum</i> Willd. <i>Asplenium serratum</i> L. <i>Campyloneurum phyllitidis</i> (L.) C. Presl <i>Microgramma lindbergii</i> (Mett.) de la Sota <i>Microgramma squamulosa</i> (Schrad.) C. Presl <i>Microgramma persicariifolia</i> (Kaulf.) de la Sota <i>Microgramma vacciniifolia</i> (Langsd & Fisch.) Copel. <i>Pecluma camptophyllaria</i> var. <i>lachnifera</i> (Hieron.) Lellinger <i>Pecluma filicula</i> (Kaulf.) M.G. Price <i>Pecluma ptilodon</i> var. <i>robusta</i> (Fée) Lellinger <i>Pleopeltis pleopeltifolia</i> (Raddi) Alston <i>Polypodium triseriale</i> Sw.
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## ACKNOWLEDGMENTS

We thank the Servicio de Parques Nacionales y Vida Silvestre for facilitating collecting permits in Paraguay; Estela Esquivel, Alberto Madroño, Antonio Claudio Ferreira da Costa and the cuerpo de guardabosques of Mbaracayú for assistance in the field; Alberto Yanosky, Claudia Mercolli and the staff of PY for logistical help in Asunción; curators of the herbaria cited in the text for permission to examine the specimens in their care; Blanca León and Josephine Camus for a careful review of the manuscript; and the Darwin Initiative for the Survival of Species for funding this work.

Table 2 continued

River banks and Gallery forest	<i>Danaea nodosa</i> (L.) Sm. <i>Trichomanes diaphanum</i> Humb., Bonpl. & Kunth <i>Trichomanes radicans</i> Sw. <i>Trichomanes rigidum</i> Sw. <i>Alsophila cuspidata</i> (Kuntze) D.S. Conant <i>Adiantum petiolatum</i> Desv. <i>Pteris altissima</i> Poir. <i>Pteris quadriaurita</i> Retz. <i>Hemionitis tomentosa</i> (Lam.) Raddi <i>Thelypteris abbiatti</i> C.F. Reed <i>Thelypteris pachyrhachis</i> (Mett.) Ching <i>Thelypteris scabra</i> (C. Presl) Lellinger <i>Lastreopsis amplissima</i> (C. Presl) Tindale <i>Diplazium celtidifolium</i> Kuntze var. <i>puberulum</i> Stolze <i>Diplazium plantaginifolium</i> (L.) Urb. <i>Diplazium riedelianum</i> (Bong. ex Kuhn) Kuhn <i>Lomagramma guianensis</i> (Aubl.) Ching <i>Phyllitis balansae</i> (Bak.) C. Chr. <i>Blechnum binervatum</i> subsp. <i>acutum</i> (Desv.) R.M. Tryon & Stolze <i>Blechnum fraxineum</i> Willd. <i>Blechnum lanceola</i> Sw. <i>Blechnum occidentale</i> L. <i>Campyloneurum nitidum</i> C. Presl
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### BOOK REVIEW

**FLORA MESOAMERICANA Volume 1 Psilotaceae a Salviniaceae** Moran R. & Riba, R. (eds); Davidse, G., Sousa, M. & Knapp, S. (gen. eds) 1995. Universidad Nacional Autónoma de México, Missouri Botanical Garden and The Natural History Museum, London. 470 pp. Hardback. US\$85.00. ISBN 968 36 4700 6.

This is the first of seven volumes of Flora Mesoamericana, and includes 32 families, 136 genera and 1398 taxa (species, subspecies or varieties), constituting the biggest Pteridoflora published.

Flora Mesoamericana covers a geographical area from the Istmo de Tehuantepec (southern Mexico) to the border between Panama and Colombia. It includes five Mexican states (Tabasco, Chiapas, Campeche, Yucatán and Quintana Roo) as well as Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama.

Families are taxonomically arranged, while the genera and species are in alphabetical order in those cases where there is not a satisfactory taxonomic arrangement. Keys are included for all the families, genera, species, subspecies and varieties. There are general descriptions for each family and genus. For each taxon a general description, habitat, general distribution, as well as distribution within the area are included. Types are cited only for accepted names, synonyms are cited in case they are important for the area. The book includes as well a very helpful glossary. This book provides an excellent guide for all pteridologists working in Latin America, and it is worthwhile to stress that one of the great merits of the work is due to the fact that it is written in Spanish, making it very useful for the local users.

The descriptions of the species are very complete and easy to understand. However, the keys are not always easy to follow, and perhaps some drawings would be helpful in order to attain identification to species level in a more easy way. (In that respect, it can help to visit the web site <http://www.mobot.org/MOBOT/fm/>).

It provides a very important tool for all those people interested in the Pteridoflora, not only because the amount of species and information included, but also because it fills an existing gap in descriptions and keys in Spanish and it can be used for a wider geographical area than the one covered in the book.

M.C. Peña-Chocarro

## BOOK REVIEW

**INDEX FILICUM SUPPLEMENTUM SEPTIMUM PRO ANNIS 1991-1995.**

R. J. Johns. 1997. Royal Botanic Gardens, Kew. ix + 124 pp. Price £20.00. Softback. ISBN 1 900347 26 1.

Index Filicum Supplement 7 has been published less than one year after Supplement 6, to the delight of all Index Filicum users. Congratulations are due to all at Kew involved in its production. Covering five years and consisting of 124 pages, it is the smallest of the supplements apart from Supplement 2, from 1913-1916 and with 60 pages. I look forward to seeing future supplements appearing on a regular five year basis.

In format Supplement 7 follows essentially the style of Supplement 6, unfortunately complete with the loathed *Addenda*, which may have been necessary in the days of manual type setting, but is surely an anachronism in the computer era. Users of Index Filicum should heed the plea on page viii to send reprints of their papers to Kew and perhaps the *Addenda* will no longer be needed! A convenient change from the Supplement 6 format is the setting of invalid names in a distinctive type face so that they are very easily recognisable. The term '*List of species*' used in the Table of Contents in both Supplements 6 and 7 is not accurate, nor is the actual heading to this section, '*Enumeratio familiarum, genera, specierumque alphabetica*' because it does not take infraspecific taxa into account.

The *Catalogus litteraturae* contains some references published before 1991, most of which are also listed in the *Catalogus litteraturae* of Supplement 6, e. g. Burrows, J. E. (1990), South African Ferns and Fern Allies, all of R. C. Ching's publications, and Parris, B. S. (1986), Kew Bull. 41(1): 69-70; the new combinations in these works are included in Supplement 6, but not in Supplement 7. Holttum, R. E. & Grimes, J. W. (1980), Kew Bull. 34(3): 499-516 is listed in the *Catalogus litteraturae* for both Supplement 6 and Supplement 7; in the former supplement all of the new combinations and new species are listed while in the latter supplement only the two new species have been included. One publication, Holttum, R. E. (1972), Blumea 20(1): 105-126, is listed here and in Supplement 5; the new taxa and new combinations appear only in the latter. Another example of carelessness occurs in the title of a cited paper; Smith, A. R. & Palmer, D. D. (1995), *Ctenitis rubiginosa*, from Hawaii, belongs in *Nothosperma*. Amer. Fern J. 85(2): 63 – for *Nothosperma*, a non-existent genus, read *Nothoperanema*! One new combination, *Zygophlebia longipilosa* (C.Chr.) L.E.Bishop, Amer. Fern J. 79(3):109 (1989): *Polypodium longipilosum* C.Chr., has been omitted from both Supplements 6 and 7, although all of the other new taxa and new combinations in the article were included in Supplement 6.

The Introduction includes a proposed change of format to provide additional data for new taxa and new combinations for Supplement 8 (1996-2000) onwards. These will include references to illustrations in the publication where the new taxa and new combinations are published and information on the type specimens such as collector, locality, altitude, date of collection and location of holotype, isotypes and paratypes. While any extra information concerning taxa is useful, the location of authentic illustrations being particularly desirable, my personal preference is to see other improvements to the Index Filicum Supplements, such as removing the *Addenda* and reducing the number of errors. The production of Index Filicum on CD-rom should also be a priority, particularly if the *Addenda* are to become a permanent feature.

B.S. Parris

**NEW PHILIPPINE *GONIOPHLEBIUM* (POLYPODIACEAE:  
PTERIDOPHYTA)**

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Key Words: Batanes, fern, *Goniophlebium*, Philippines, Polypodiaceae.

**ABSTRACT**

The new species *Goniophlebium coadunatum* (Polypodiaceae) from the Batanes islands, between Luzon and Taiwan, is described. An ally of *G. benguetense*, also from the Philippines, it is distinguished principally by its coadunate frond apex.

**INTRODUCTION**

Mount Iraya of Batan Island is the highest point in the wind-swept Batanes Islands, located nearly equidistant from northern Luzon and southern Taiwan, which are about 350 km apart. A detailed floristic analysis of the pteridophytes of Mt Iraya was prepared by Barcelona (1994). Previously, seven fern taxa were described from type collections made on Mt Iraya or in the Batanes, namely *Athyrium irayense* Copel. [= *Diplazium doederleinii* (Luer) Makino], *Cyathea fenicis* Copel., *Cyclosorus irayensis* Copel. [= *Sphaerostephanos irayensis* (Copel.) Holtt.], *Grammitis fenicis* Copel., *Lygodium mearnsii* Copel. [= *L. japonicum* (Thunb.) Sw.], *Pteris rigidula* Copel. [= *P. spinescens* C. Presl], and *Sphaerostephanos fenixii* Holtt. [= *S. irayensis* (Copel.) Holtt.]. Two of these, *G. fenicis* and *S. irayensis*, are still recognized as endemic to Mt Iraya and Batan Island, and we are here adding a third:

***Goniophlebium coadunatum* Barcelona et M.G. Price, *sp. nov.* (Fig. 1)**

*Goniophlebium benguetense* Philippinarum maxime affinis autem apice frondis coadunato potissime differt. Etiam differt soris adaxialibus prominentioribus, paraphysibus setulosis vice clavatis in centro sororum, pinnis latioribus ambitu basis pinnarum angustioribus, glandulis minutis marginalibus palearum deficientibus.

Holotypus: J.F. Barcelona 988, Philippines, Batanes, Mt Iraya (PNH).

Rhizome long creeping, 2-5 mm across, surface uniformly dull blackish, not chalky, internal sclerenchyma strands over 100. Paleae dense, persistent, bright brown, lanceate, long attenuate, to 6 mm long, 1.5 mm broad at base, with projections of the clathrate lattice forming lateral teeth. Stipe (7.4-) 26-45 cm long, (1.4-) 2.1-3.6 mm across at base, stramineous to brown (green above, dark below when fresh), with numerous minute maroon palea-base remnants. Lamina lanceolate-ovate, apex coadunate, (14.5-) 38-51 x (7.5-) 21-32 cm, bearing (12-) 16-35 pairs of pinnae, thin-papyraceous, rachis with very narrow wing joining laminar tissue of pinnae, rachis and costae with small, toothed paleae below, glabrous above. Pinnae sessile,

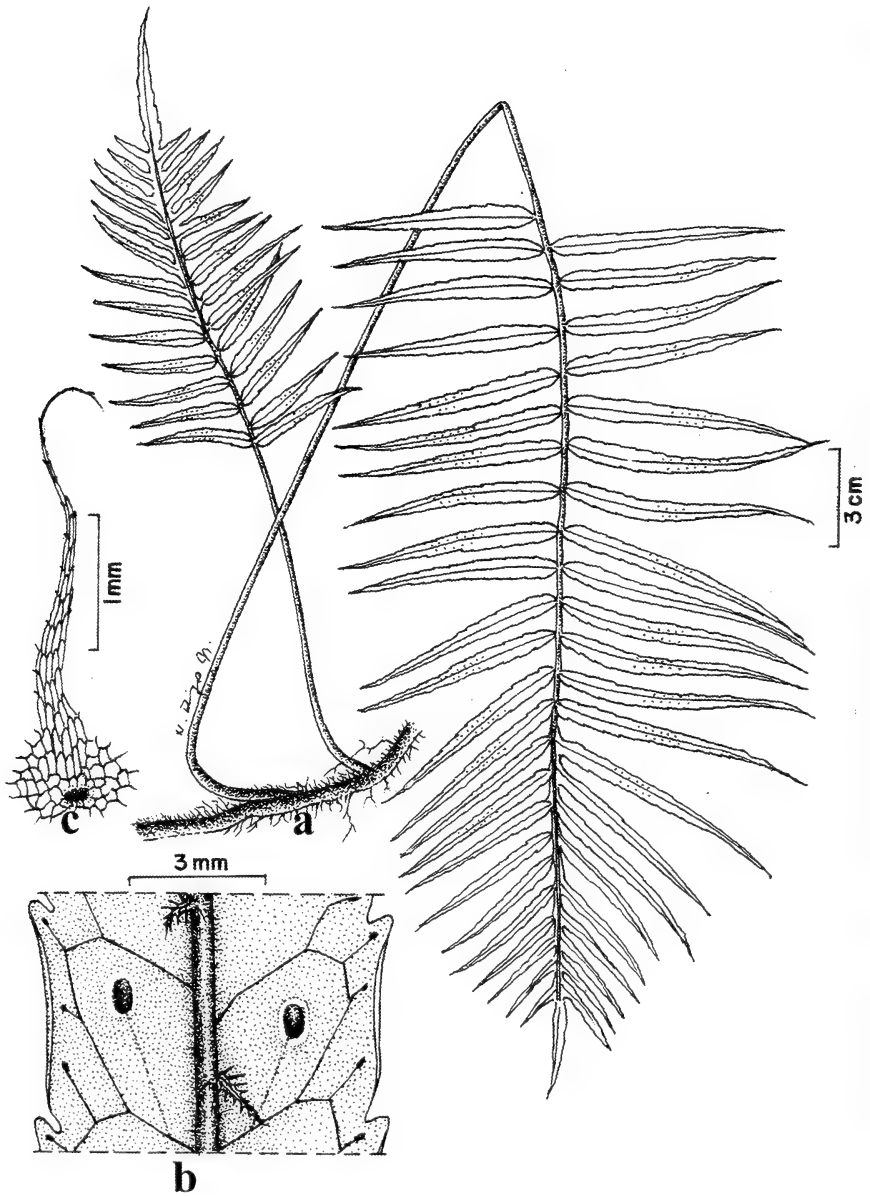


Figure 1: *Goniophlebium coadunatum* Barcelona & M.G. Price.  
a. Habit of adult plant; b. Portion of the lower surface of a pinna showing impressed sori and paleae; c. rhizome palea. (Barcelona 491). [Illustrated by Nemesio Diego, Jr. (PNH)]

articulate, opposite to subopposite, often ranging to alternate distally, patent to slightly ascending, the largest (4.4-) 12-15 cm x (5-) 8-12 mm, basal to submedial, base broadly cuneate, often auricled on both sides, margins serrulate, apex acuminate, uppermost pinnae adnate, decrescent to non-articulate segments, terminal lamina lobed at base, then pinna-like. Veins forming one series of large areoles with a fertile free-included-veinlet on each side of costa, then with irregular small areoles, or free. Sori medial, round to slightly oval, 1-1.5 mm across, notably impressed, bearing conspicuous variably-branched paraphyses with shiny dark maroon setae shorter than mature sporangia. Spores pale yellow, 42.5-52.5 x 25-30  $\mu\text{m}$ , exospore smooth, perispore longitudinally winged with polar protuberances.

Type: J.F. Barcelona 988, Philippines, Batanes, Batan Island, Basco, Valugan, Dujtak, Mt Iraya, 100-200 m, epiphytic on trunks and petrophytic, 03 December 1993 (holotype: PNH; isotypes: K, MICH, MU, US). Paratypes: J.F. Barcelona 491, Mt Iraya, 500 m, epiphytic on trunk, April 1991 (L, PNH, TI).

This amply distinct new species is most closely related to *G. benguetense* (Copel.) Copel. which also has similar rhizome sclerenchyma strands, paleae, stipes, lamina and pinna shape, sori, paraphyses and spores. It differs most notably from *G. benguetense* by the consistently coadunate apex, a character not found in any member of the '*G. percussum*-group' in which Rödl-Linder (1990) placed that species. Whilst the absence of the coadunate apex character in all closely-related species facilitates the recognition of *G. coadunatum*, its presence in this species weakens the definition of any such group. Other differences are that *G. benguetense* has a more slender rhizome, shorter paleae having a thinner and grayish-brown lattice and bearing fewer marginal teeth but with numerous minute marginal glands, pinnae subtruncate at base but generally narrower, sori superficial or only very slightly impressed, and receptacular paraphyses with clavate branch-tips near the center of sori. The two known populations of *G. coadunatum* occur on trunks and rocks in shade in the remaining patches of lowland evergreen forest on the lower slopes of Mt Iraya from about 100-500 m whereas *G. benguetense* is a plant of mossy forests in Luzon at higher elevations, to 1500 m.

Also related to *G. benguetense* is *G. demersum* (Brause) Rödl-Linder of the Moluccas and New Guinea. It differs from *G. coadunatum* by its conform terminal pinna, thicker lamina, broader rhizome paleae, suprasedial and only very shallowly impressed sori, and paraphyses broadly scaly.

The East Asian *G. mengtzeense* (Christ) Rödl-Linder, which extends to Luzon, also has a coadunate laminar apex (although described as conform by Rödl-Linder, 1990) but differs from *G. coadunatum* by its chalky rhizome, lamina paler in color, pinnae broader, ascending, more shallowly toothed, sori superficial, and paraphyses palea-like, among other characters.

The recent monograph of *Goniophlebium* by Rödl-Linder (1990) and her revision of the Philippine species (1987) provide useful information with descriptions, synonymy, and specimen citations, and have greatly increased our confidence in recognising this new species. In Barcelona (1994, p. 131, f. 18) this species appeared as an unnamed *Goniophlebium*.

The finding of a species of *Goniophlebium* apparently restricted to a single Philippine volcanic mountain of medium size (only slightly over 1000 m elevation), has the precedent of *G. terrestre* Copel. which has been collected only from Mt Makiling in south-central Luzon. Like *G. coadunatum*, *G. terrestre* is a forest shade plant surviving only as a few local populations.

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